TECHNOLOGY DEPT.

the OIL AND GAS JOURNAL

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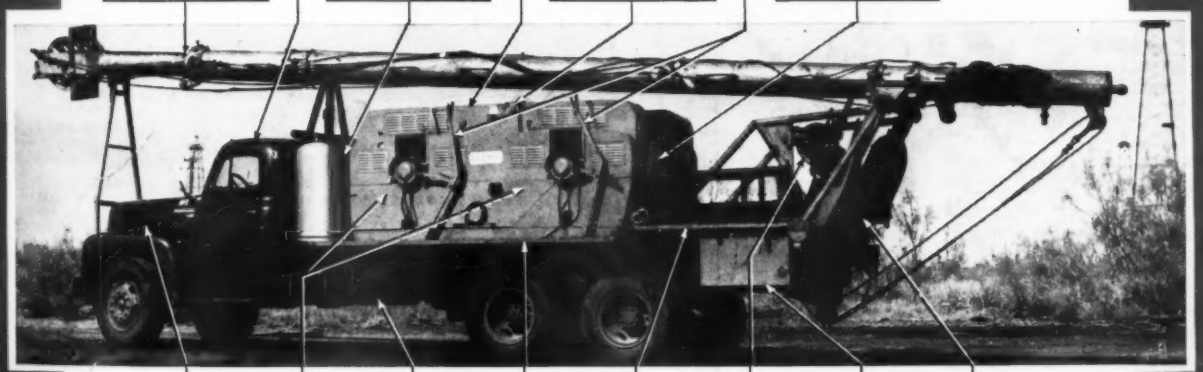
DETROIT

FRANKS is the *ONLY* manufacturer who makes it possible to have a *COMPLETE* servicing unit in one SELF PROPELLED vehicle*

*Meets highway requirements of all states.



FRANKS MFG CORP WELL SERVICING AND DRILLING UNITS

"on the SPOT" FIELD SERVICE

The basic Franks truck-motor-driven servicing unit consists of the hoist, power-take-off, truck-bed, controls, and operator's platform mounted on a suitable truck. This unit is capable of rod, tubing, and long line work under production derricks. If your requirements call for a more completely equipped unit, any or all of the optional components, shown in the picture, may be added. Servicing contractors find Franks units do more work, more easily, more economically. Write for Franks new bulletin on servicing units, or see a Franks representative.

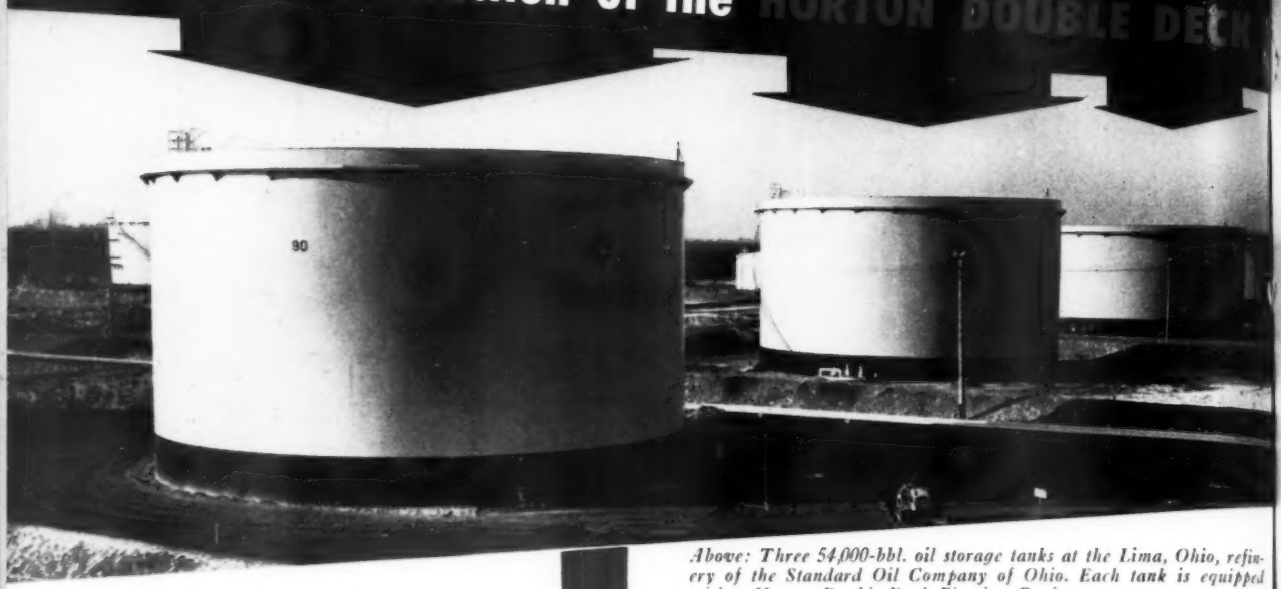
FRANKS MFG CORP
WELL SERVICING AND DRILLING UNITS
TULSA, OKLAHOMA

Box 3218, Tulsa, Oklahoma
Export: 1x5 Broadway, New York

PRICE 50 CENTS TABLE OF CONTENTS PAGE 51 OCTOBER 26, 1950

XUM

No other floating roof can match the simplified design and rugged construction of the HORTON DOUBLE DECK



Above: Three 54,000-bbl. oil storage tanks at the Lima, Ohio, refinery of the Standard Oil Company of Ohio. Each tank is equipped with a Horton Double-Deck Floating Roof.

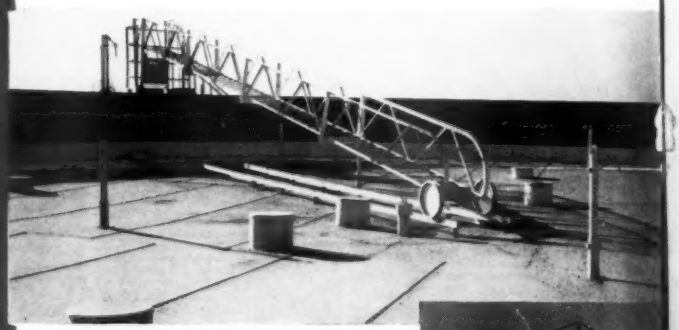
You'd be wise to consider *construction* before selecting any floating roof. Why? Because you buy a floating roof principally for protection . . . protection from excessive evaporation losses, from the hazard of fire, and from high maintenance costs. Whether or not you get the protection you're paying for is, in large measure, a matter of construction. That's why it is important to determine how well the roof you buy is built.

In the case of the Horton® Double-Deck Floating Roof, you will find simple, rugged construction throughout . . . every detail has been designed and built to give years of trouble-free service. Take the seal for instance. The Horton® seal consists of only three principal parts—a sealing ring, pantagraph hangers, and a continuous rubberized fabric. This combination is so effective in preventing the escape of vapor that it is not necessary to use secondary seals or other "gadgets." The hangers—one mechanism in the seal—are of heavy construction with adequate tolerances so that they will not stick or bind.

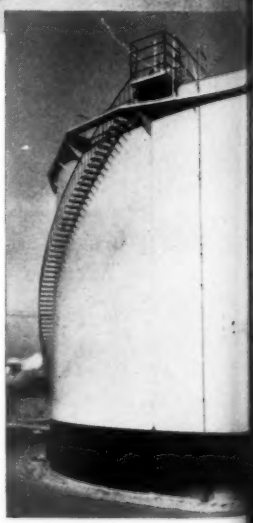
The accompanying illustrations show other features that emphasize the simplified design and rugged construction of the Horton® Double Deck Floating Roof. For complete details about a floating roof that cannot be matched, write our nearest office for Bulletin B.

We also build Hortonspheres, Hortonspheroids and Hemispheroids for storing liquids under pressure, and Horton Vaporspheres, Vapordome Roofs and Lifter Roofs for vapor-saving systems serving one or more tanks. Please get in touch with us when you desire estimating figures on storage tanks or other steel plate structures.

® Trademark Registered U.S. Patent Office



Above: View looking across the Horton Double-Deck Floating Roof in one of the tanks in the illustration at the top of the page. Notice that there are relatively few operating devices and fittings on the top of the deck. Notice also the sturdy rolling ladder and neat manholes and covers. This clean-cut, rugged construction emphasizes the value of our long experience as builders of floating roofs.



Right: View showing how the stairway curves smoothly through the wind girder. The stairway doesn't bulge over the girder and thus is easier to climb. Also, this part of the girder is reinforced to compensate for the cut-out.

Here again our experience as a tank builder results in simple, strong, easy-to-maintain construction.

CHICAGO BRIDGE & IRON COMPANY

Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY and GREENVILLE, PENNSYLVANIA

Atlanta, 3.....2154 Healey Bldg.
Birmingham, 1.....1536 North 56th St.
Boston, 10.....1625—201 Devonshire St.
Chicago, 6.....2729 McCormick Bldg.
Cleveland, 15.....2204 Guildhall Bldg.
Detroit, 26.....1514 Lafayette Bldg.
Houston, 2.....2119 National Standard Bldg.
Los Angeles, 17.....1521 General Petroleum Bldg.
New York, 6.....3347—165 Broadway Bldg.
Philadelphia, 3.....1415—1700 Walnut Street Bldg.
Salt Lake City, 4.....525 West 17th South St.
San Francisco, 4.....1554—200 Bush St.
Seattle, 1.....1325 Henry Bldg.
Tulsa, 3.....1656 Hunt Bldg.

REPRESENTATIVES AND LICENSEES

Horton Steel Works, Limited, Fort Erie, Ontario, Canada
Ateliers et Chantiers de la Seine Maritime, Paris, France
Constructions Métalliques de Provence, Arles-sur-Rhone, France
Compagnie Technique Industrielle Petrofi, Roma, Italy
Procon, Limited, Darlington, England
Motherwell Bridge & Engineering Company, Limited, Motherwell, Scotland

in a Bethlehem Swivel

THE WASHPIPE LASTS JUST TWICE AS LONG

Even a Bethlehem washpipe doesn't have the cat's traditional nine lives. But it does have *two!* An ingenious, movable locking device makes it possible to divide the points of wear, instead of concentrating it all in a single place.

Briefly here's the picture: when the washpipe is locked at the top, so that it cannot turn inside the top packing, the wear takes place at the bottom end of the pipe. When it is locked at the bottom and turns with the swivel stem, the reverse is true. Thus the wear can be divided—half at the bottom, half at the top. The washpipe lasts just twice as long. There's also a saving in packing, and—what is more important—*a saving of costly shutdown time.*

This is but one of the many fine features of Bethlehem swivels—a line with capacities ranging from 60 to 300 tons. For full details, check with a Bethlehem Supply representative—or ask for our latest literature.

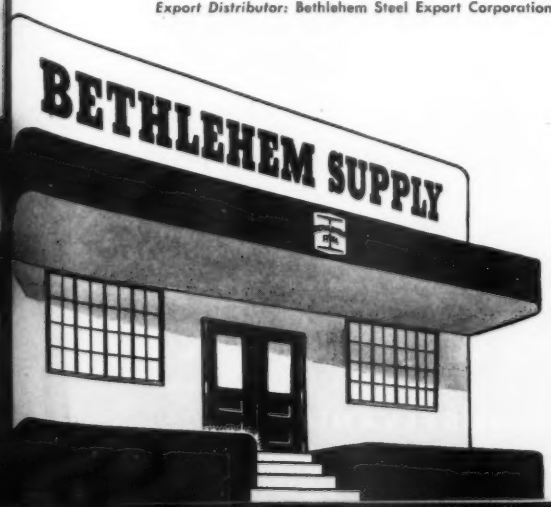
BETHLEHEM SUPPLY COMPANY

General Offices: 21 E. Second Street, Tulsa, Okla.

Subsidiary of Bethlehem Steel Corporation

On the Pacific Coast Bethlehem Oil-Field Equipment is sold by Bethlehem Supply Company of California

Export Distributor: Bethlehem Steel Export Corporation



Other Features of Bethlehem Swivels:

100% Roller-Bearing Construction
Oil-Bath Lubrication for All Bearings
Forged-Steel Swivel Stem Fully Protected from Wear or Cutting
Forged-Steel Bail
Double-Shear Bail Pins, Held in Housing at Both Ends
A. P. I. Hose Connection
Rubber Elevator Rest

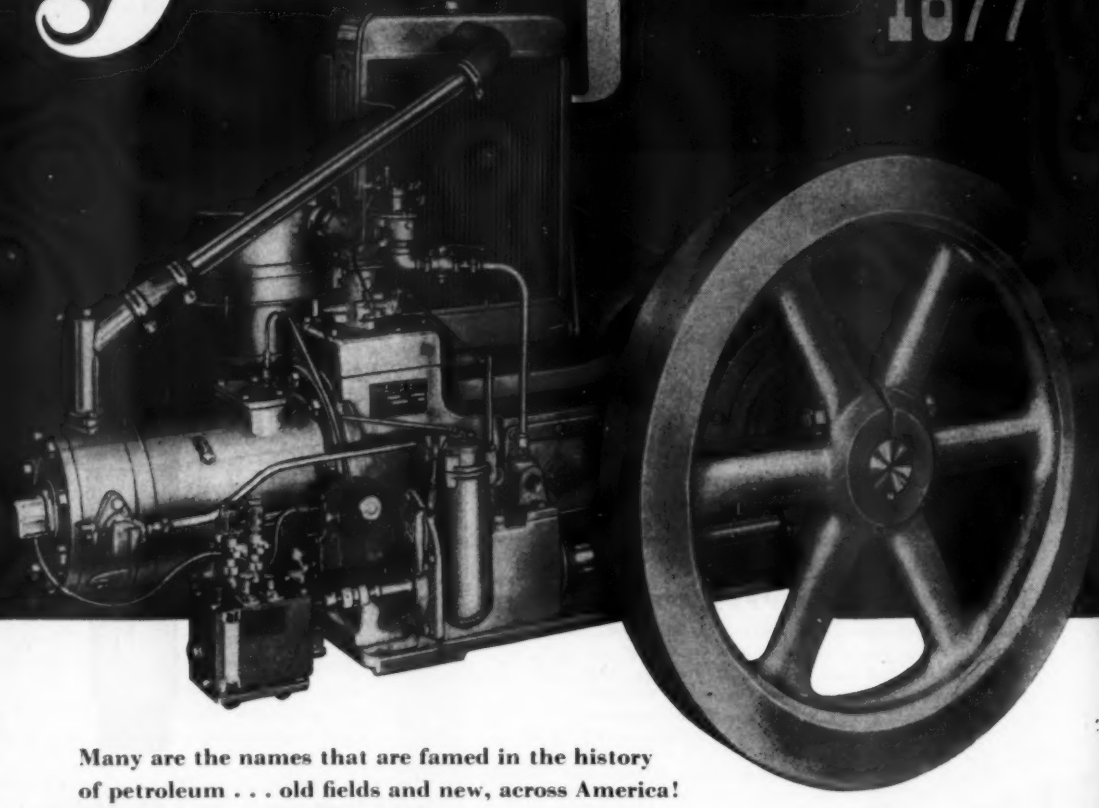
XUM

PITHOLE GLENN POOL ELDORADO
CASPAR SPINDLETOP LIMA-INDIANA
HOGBACK
CAT CREEK LONG BEACH SMACKOVER
ENNINGS SIGNAL HILL
EAST TEXAS SALT CREEK LOUDEN
SCURRY COUNTY

Famous names in petroleum through the years

Ajax

Famous name in oilfield engines since 1877



Many are the names that are famed in the history of petroleum . . . old fields and new, across America!

In the history of oilfield *engine* development, however, ONE famous name tells the story . . . one name, AJAX, has signified leadership for seventy-three years in engine design and performance. • The Ajax nameplate on your gas or oil engine tells you that everything needed has been supplied in full measure. Ask your Supply Man for the details!

AJAX ENGINES

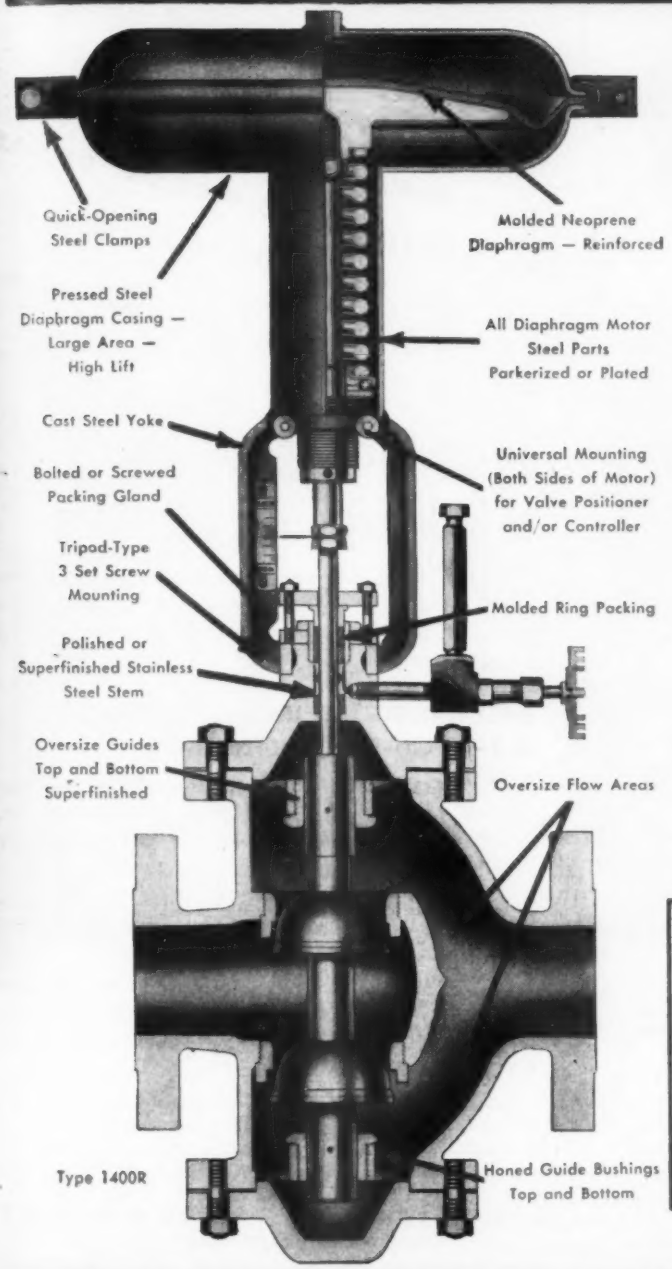
AJAX IRON WORKS

Manufacturers of Gas Engines • Steam Drilling Engines • Industrial Steam Engines

CORRY, PENNSYLVANIA

Oil Field Distributors: THE NATIONAL SUPPLY CO., TOLEDO, O. R. B. MOORE SUPPLY CO., INC., BOLIVAR, N. Y.
BETHLEHEM SUPPLY CO., TULSA, OKLA.

K&M ADVANCED-TYPE VALVE FOR EXACTING CONTROL


Quick-Opening Steel Clamps
Pressed Steel Diaphragm Casing — Large Area — High Lift
Cast Steel Yoke
Bolted or Screwed Packing Gland
Tripod-Type 3 Set Screw Mounting
Polished or Superfinished Stainless Steel Stem
Oversize Guides Top and Bottom Superfinished
Type 1400R
Molded Neoprene Diaphragm — Reinforced
All Diaphragm Motor Steel Parts Parkerized or Plated
Universal Mounting (Both Sides of Motor) for Valve Positioner and/or Controller
Molded Ring Packing
Oversize Flow Areas
Honed Guide Bushings Top and Bottom

K & M Diaphragm Control Valves embody the accessibility and other desirable features of the "open yoke", formerly available only in cast iron construction, together with the strength and resistance to shock found only in steel.

The diaphragm casing assembly is the exclusive K & M Boltless Duoseal design which allows quick disassembly. The large diaphragm is molded so there is full effective contact with the diaphragm button during the complete valve stroke. This construction, together with heavy, calibrated, long-travel springs gives an unusually high power factor for extremely precise control.

Flow passages of the valve body have a minimum average area of 140% of comparable size pipe area; inner valve open free areas average 80% of pipe area. This design permits pressure drop to take place principally through the inner valve, assuring complete control over the full valve stroke.

Send for K & M Bulletin S10 for details and data.

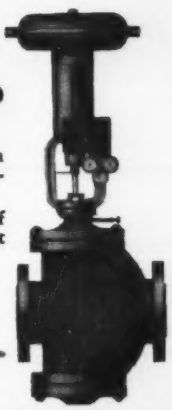
K&M SERIES 1200 and 1400

Available sizes — ½ to 16 inches.

Construction — Cast iron, carbon and stainless steels and most machineable alloys.

Inner Valves — A wide range of styles and characteristics to meet varying requirements.

Action — Designed for direct or reverse action.



KIELEY & MUELLER

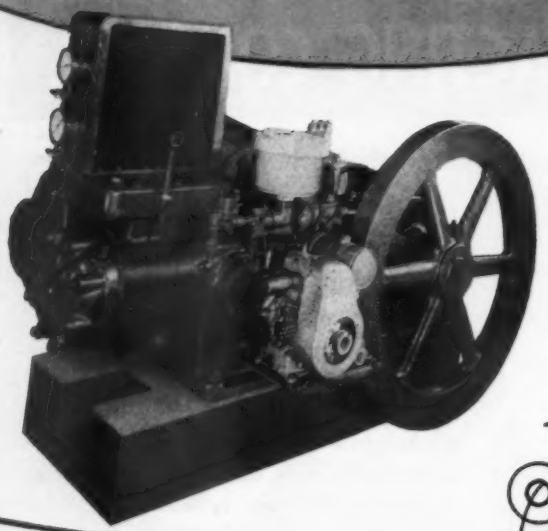
Established 1879

2033 - 43rd STREET NORTH BERGEN, N. J.

The modern K & M line includes Diaphragm Control Valves, Liquid Level Controls, Pressure Pilots and related equipment for steam, gas, air, oil and liquid service. Ask for K & M catalogue 47.

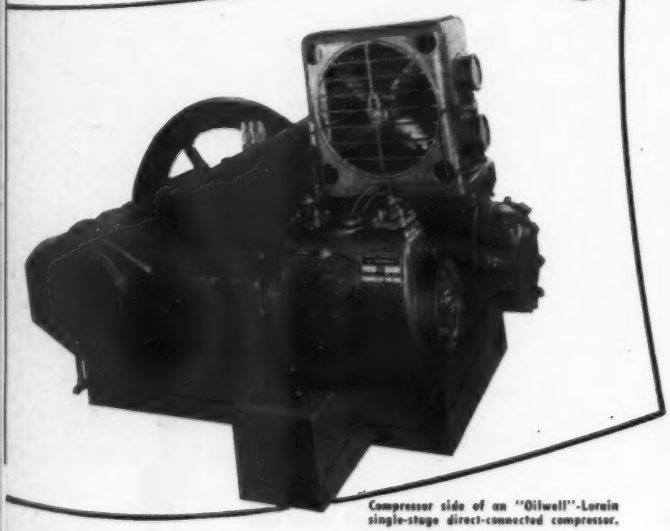
XUM

The New "Oilwell"-Lorain Direct-Connected Compressors are designed *for*—



Engine side of an "Oilwell"-Lorain single-stage direct-connected compressor.

- GAS LIFT PRODUCTION
- RECYCLING OF GAS
- SECONDARY RECOVERY OF OIL
- UNDERGROUND STORAGE OF GAS
- GAS TRANSMISSION



Compressor side of an "Oilwell"-Lorain single-stage direct-connected compressor.

20·30·40·50 HP available in both single and two-stage

"OILWELL"-Lorain Direct-Connected Compressors handle gas at the pressures required by the Oil and Gas Industry as compressors, gas boosters and vacuum pumps.

THESE FEATURES WILL INCREASE EFFICIENCY IN YOUR GAS-BOOSTER OPERATIONS

COMPACTNESS — The compressor, of these new type "Oilwell"-Lorain units, is "direct-connected" with the engine; making a complete one-piece gas compressor station ready for immediate service.

DEPENDABILITY — "Oilwell"-Lorain Compressors are designed to withstand hard, continuous service with a minimum of attention and maintenance.

FLEXIBLE POWER END — Single-cylinder, two-cycle Lorain Engines are designed for operation on natural gas, propane or butane. Conversion to diesel operation can be accomplished easily and quickly.

Contact your nearest "Oilwell" representative and ask for our latest compressor literature. Your "Oilwell" representative is always ready and willing to provide technical assistance in analyzing your compressor needs.

BRIEF SPECIFICATIONS — 30 HP Unit

	Single-Stage	Two-Stage
Operating Speed Range	250-450 rpm	
Cooling System (engine)	Radiator Type	
Cooling System (compressor)	Radiator with pump	
Compressor Bores	To customer specification	
Engine Bore and Stroke	9½" x 10"	
Height	48"	62"
Length	136"	149"
Width	39"	39"
Net Weight	6500 lbs.	8000 lbs.

OIL WELL SUPPLY COMPANY

Branches Serving All Oil Fields

Executive Offices—DALLAS, TEXAS
Export Division Office—
30 ROCKEFELLER PLAZA
NEW YORK 20, N. Y.

Division Offices—CASPER, WYOMING
COLUMBUS, OHIO . . . DALLAS, TEXAS
HOUSTON, TEXAS...TULSA, OKLAHOMA
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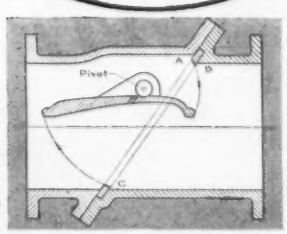
USS "OILWELL"

UNITED STATES STEEL

STOP Destructive Pipe-Line Stresses

with CHAPMAN TILTING-DISC CHECK VALVES



Cross-section of the Chapman Tilting Disc Check Valve illustrating the way that the balanced disc is supported on the pivot, with arrows showing the travel of the disc. A feature of the design is that the disc seat lifts away from the body seat when opening, and drops into contact when closing, with no sliding or wearing of the seats.

When you reduce slamming you reduce the hazard of rupturing pipe lines, opening up joints . . . . a host of maintenance problems.

That is why we suggest you investigate Chapman Tilting-Disc Check Valves. The balanced disc in this unusual valve lifts away easily in opening . . . rides smoothly on the flow . . . closes quickly but quietly. There's no slamming . . . minimum wear on valve parts and minimum stresses on pipe lines.

Special designs with dashpots are also available for use under unusual operating conditions, where no self-acting Check Valves can function satisfactorily.

Made in both iron and steel . . . pressures up to 3000 pounds.

You'll find it will pay you to write today for more information on this valve developed by Chapman. Request Bulletin #30.

The Chapman Valve Mfg. Co.

INDIAN ORCHARD, MASSACHUSETTS

The Oil and Gas Journal, published Thursdays by The Petroleum Publishing Company. Entered as second-class matter September 1, 1910. at post office at Tulsa, Okla., under act of March 3, 1879. U. S. and foreign rates to the petroleum industry, $3 yearly. Copyright 1950.

XUM

OUTSTANDING MECHANICAL EXCELLENCE

. . . . . marks every Chrysler Industrial Engine

Completely Waterproofed Ignition

All Friction Surfaces Superfinished

Sodium Cooled Exhaust Valves

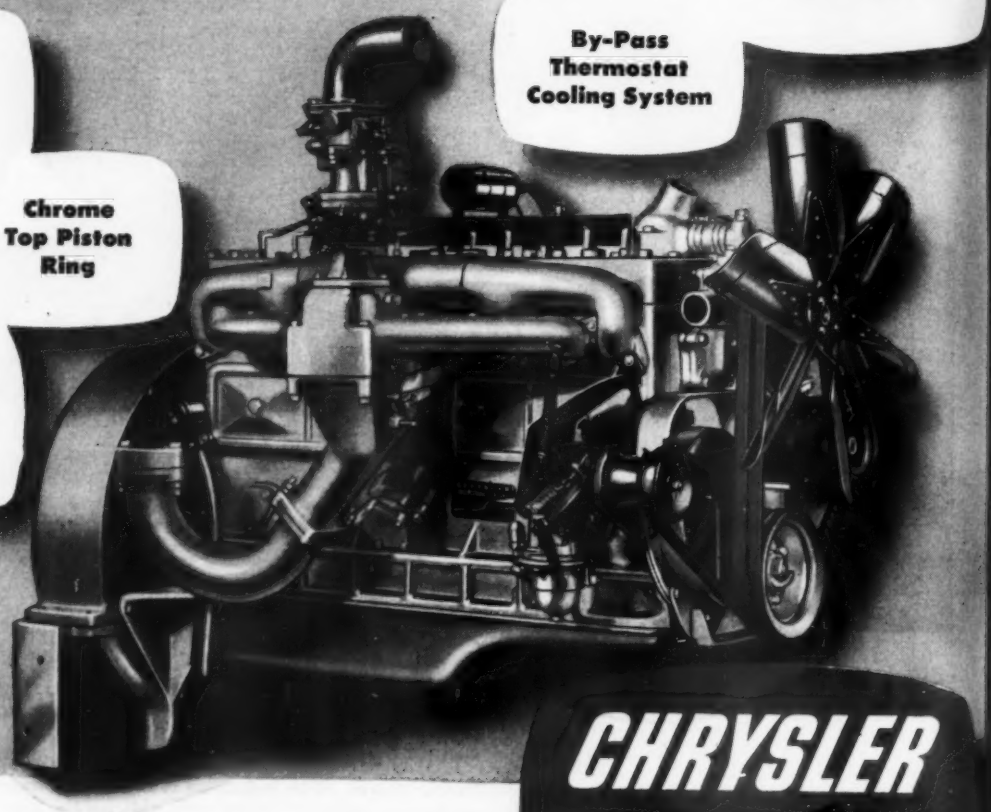
Statically and Dynamically Balanced Crankshaft

By-Pass Thermostat Cooling System

Stainless Steel Valve Springs

Chrome Top Piston Ring

Stellite Exhaust Valve Seat Inserts



Chrysler Industrial 12 — one of eight basic models

CHRYSLER

Built to operate at high speeds— deliver better performance and more power for less money!

The proof is plain for all to see!

Higher speed engines have been proved superior on every type of gasoline powered industrial equipment.

Chrysler, first to develop higher speed engines, has consistently led the advance with a continual parade of new engineering improvements.

On every type of job requiring industrial power, Chrysler high speed engines have out-performed, out-lasted and out-economized all similarly rated engines. Today, more equipment is being powered by Chrysler Industrial Engines than ever before. And the trend is continuing at an accelerated rate.

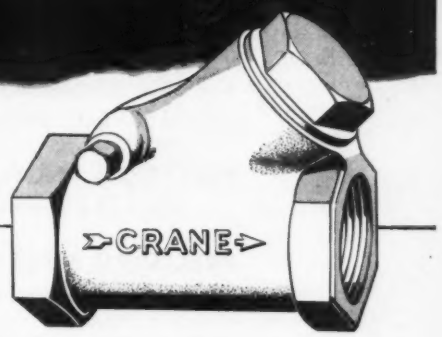
The reasons are particularly significant. May we tell you about them? See your Chrysler Industrial Engine Dealer or write us. ***Industrial Engine Division, Chrysler Corporation, Detroit 31, Michigan.***

More **CRANE VALVES** are used than any other make

Crane "Pulsator" test of check valve endurance. By continuous sudden reversals of air pressure, valve discs are slammed open and shut at rates up to several hundred cycles per minute.

How Many Checks in a Good Check Valve?

You don't buy them that way, but that's what finally determines the value of check valves in your pipe lines. That's why Crane is so completely equipped for accurately pre-testing valve performance. For instance, "wearability" of check valves is tested by opening and closing the valves continuously on various fluids under conditions of actual service. Special equipment is used to accelerate these tests to equal many years' service in a short period. Countless tests like this—of materials, designs, and finished products—insure the superior performance values that mean lower piping costs for users of all Crane valves and fittings.



This new regrinding Brass Swing Check design typifies Crane's continuing product development for better valve performance, lower piping maintenance costs. For increased flow capacity . . . for fast, positive closure on backflow . . . for easier servicing without removing valve from line . . . get a demonstration of these 200 and 300-Pound Y-Pattern Check Valves. Phone your Crane Representative, or ask for literature.

CRANE VALVES

CRANE CO., *General Offices:* 836 S. Michigan Ave., Chicago 5, Ill.
Branches and Wholesalers Serving All Industrial Areas

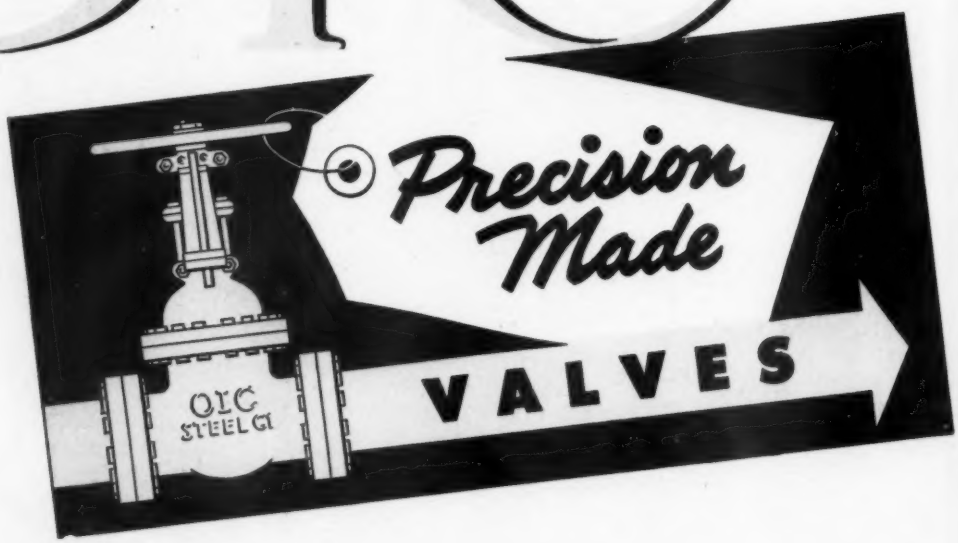
VALVES • FITTINGS • PIPE • PLUMBING • HEATING

XUM

JUST SAY

OIC

FOR



For any valving requirement, you can specify OIC Valves and be sure of efficient, precise control. That's because OIC Valves are:

PRECISION ENGINEERED—positive closure . . . minimum friction . . . designed for smooth, free flow of air, gases and liquids.

PRECISION BUILT—every essential part accurately finished for a precise fit, on the most modern production equipment.

PRECISION APPLIED—OIC engineers always available to help you select valves best suited to each job, at lowest cost.

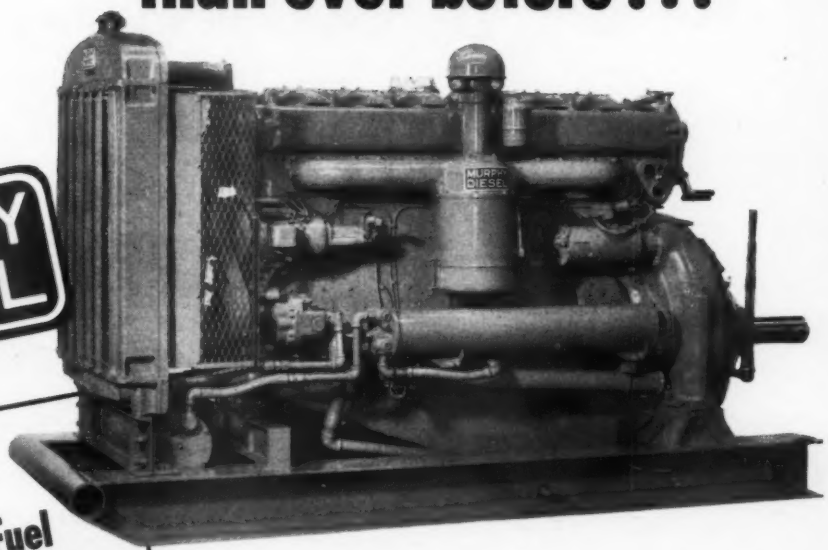
Here's a three-way combination that provides "*precision valve*" *equipment* in your plant. First costs and upkeep costs are lower. See your local OIC distributor, or write us direct. Ask for a free copy of the 1950 OIC Valve Cross-Reference Chart. The Ohio Injector Company, Wadsworth, Ohio.

OIC
FOUNDED 1883

VALVES

FORGED AND CAST STEEL · IRON · BRONZE

NOW MURPHY DIESEL offers you a broader range of sizes than ever before . . .



MURPHY DIESEL

- ✓ 24 Models
- ✓ Diesel or Dual-Fuel
- ✓ 1200 or 1400 RPM
- ✓ Engines or Power Units
- ✓ Generator Sets
- ✓ Crude Oil Engines

WITH its broad new line, Murphy Diesel makes its advantages of economy and dependability available to more power users than ever before. Now you can have 1200 or 1400 continuous rpm operation in engines or power units capable of delivering 90 to 220 H.P.; altitude engines, which maintain sea level ratings at altitudes up to 9000 ft., are also available. Murphy Diesel Generator Sets offer continuous ratings from 60 to 133 K.W. Dual-fuel engines, rated from 135 to 180 H.P., permit switching from diesel to natural gas fuel at the flick of a lever; also crude oil engines.

Whatever your power requirements, it will pay you to get the facts on Murphy Diesel. Write for a copy of the booklet *"10 Questions to Ask a Diesel Engine Salesman"* or see your Murphy Diesel Dealer.

MURPHY DIESEL COMPANY
5305 W. Burnham St.
Milwaukee 14, Wisconsin
OIL INDUSTRY FACTORY BRANCH
—Sales, Parts and Service
113-117 South Elwood Street, Tulsa, Okla.

And only MURPHY offers all these design features:

- TRUE DIESEL OPERATION gets more work out of your fuel . . . minimizes wear and tear on the engine.
- UNIT FUEL INJECTION eliminates the troubles of ordinary diesel fuel injection systems.
- FOUR VALVES PER CYLINDER increase efficiency and put an end to valve troubles.
- HYDRAULIC SERVO-TYPE GOVERNOR protects the engine and assures immediate response to power demands.
- HEAVY DUTY CONSTRUCTION assures thousands of hours of dependable service.

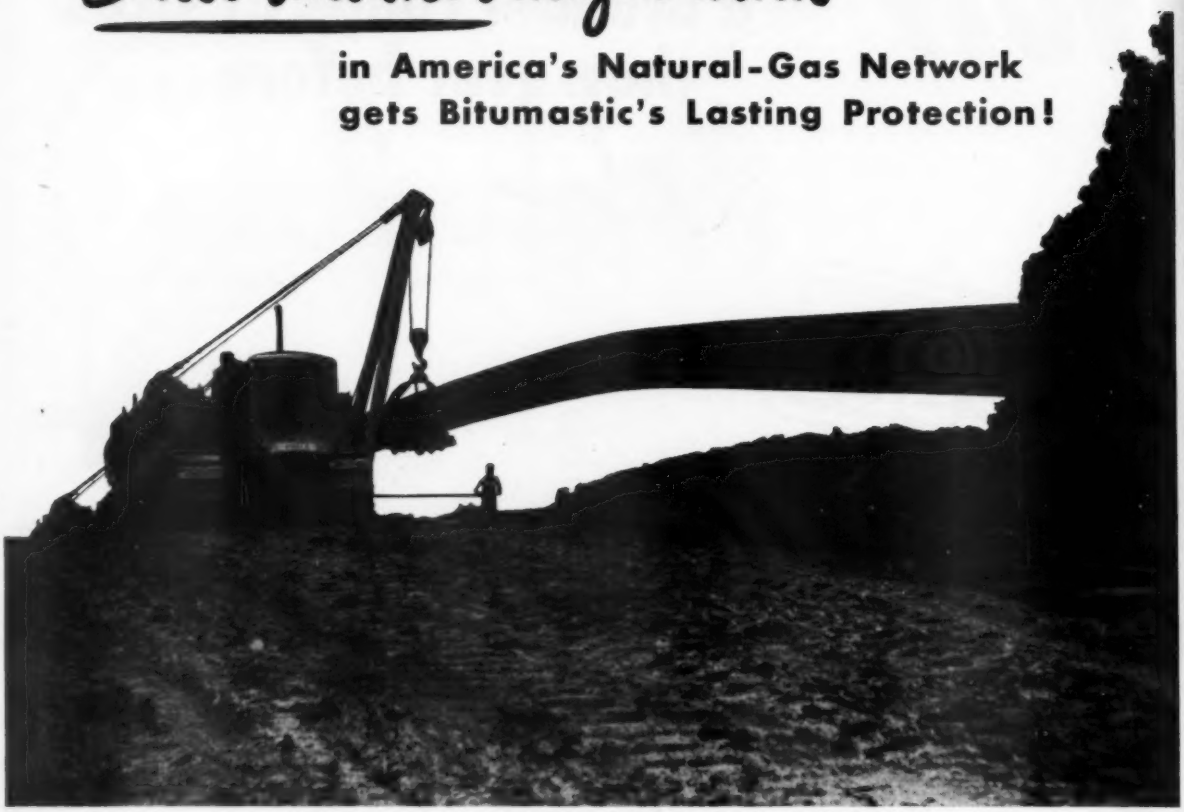
Or See Your Nearest Dealer

Amarillo, Texas
Service & Supply
Dallas, Texas
Conley-Lott-Nichols Mach. Co.
Evansville, Ind.
Pershing Equipment Co.
Houston, Texas
Houston Engine & Pump Co., Inc.
Mt. Vernon, Ill.
Ed Meyer Tractor Co.
Kilgore, Texas
B & G Engine Service
Los Angeles, Cal.
Engine Sales & Service
Odessa, Texas
Electric Service & Supply Co.
San Antonio, Texas
J. E. Ingram Equipment Co.
Jackson, Mich.
Utility & Industrial Supply
Great Bend, Kans., Manufacturers Dist. Co.

XUM

Still another major link

in America's Natural-Gas Network gets Bitumastic's Lasting Protection!



Koppers Bitumastic XXH Enamel being machine-applied

● The southern end of the Tennessee Gas Transmission Company's new line from Kentucky to Buffalo is protected against corrosion by Koppers Bitumastic® XXH Enamel. This extension consists of 373 miles of 26" pipe.

Koppers Bitumastic Enamels have established enviable records in combating corrosion. Under the most severe corrosive conditions . . . in all types of soil . . . under wide variations of temperature—pipe lines protected by Koppers Coatings have been giving good service for twenty and thirty years. And the experience gained by Koppers engineers in protecting these lines can be helpful to you.

Specify "Koppers Bitumastic Enamel" for your next pipe-line project. You'll be getting a protective coating that has been proved by performance. Your Koppers representative will give you complete details and estimates.

Why Bitumastic Enamels give lasting protection

Processed from a base of coal-tar pitch, they are impervious to moisture . . . chemically resistant to soil elements. They make a tight bond with the pipe . . . do not disintegrate with age . . . maintain continuously high electrical resistance.

KOPPERS BITUMASTIC ENAMELS

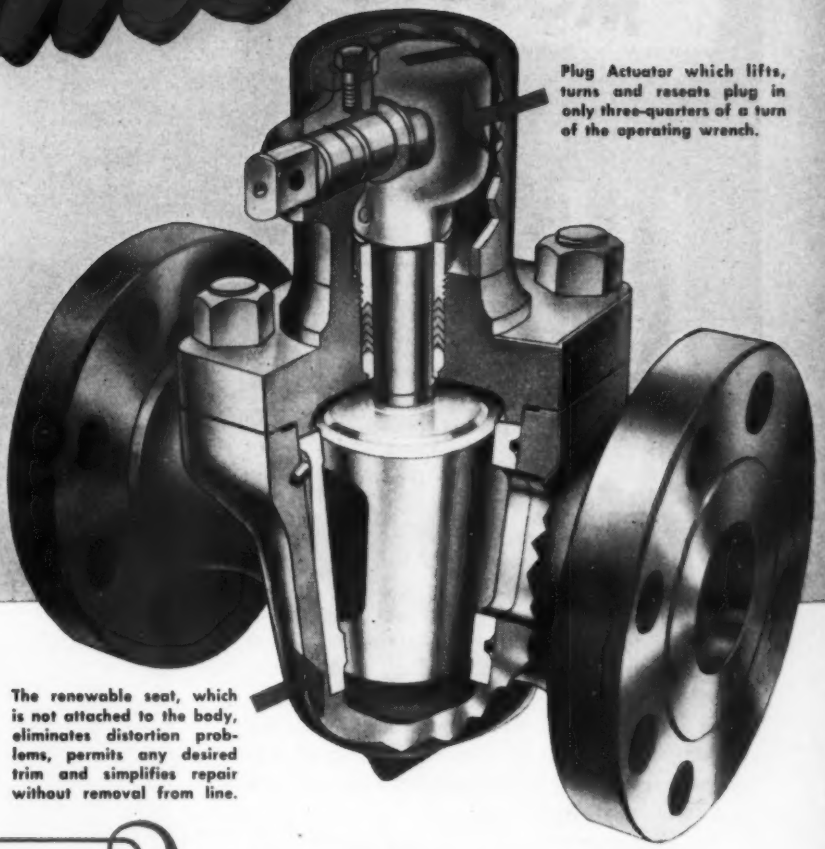
REG. U.S. PAT. OFF.

KOPPERS COMPANY, INC., Tar Products Division, Dept. 1003T, Pittsburgh 19, Pa.

THE GREATEST VALVE ADVANCEMENT IN YEARS

Cameron

NON-LUBRICATED LIFT-PLUG VALVES



Plug Actuator which lifts, turns and reseats plug in only three-quarters of a turn of the operating wrench.

The renewable seat, which is not attached to the body, eliminates distortion problems, permits any desired trim and simplifies repair without removal from line.

IDEAL FOR

Refinery Service

- GASOLINE DISTILLATE
- HYDROFLUORIC ACID
- SULPHURIC ACID
- DOCTOR SOLUTION
- CHLORINE
- BUTANE
- PROPANE
- LPG
- SALT WATER
- STEAM

AND OTHER CORROSIVE PRODUCTS

NON-LUBRICATED—no grease of any kind required to effect a seal; prevents contamination of line products; and reduces chance for human error and need for maintenance.

PRESSURE SEALING—when plug is seated, line pressure automatically forces seat into tighter engagement with plug—body distortions do not affect the seal.

UNIQUE LIFT-PLUG ACTUATOR — a novel mechanical design which lifts, turns and reseats plug in continuous turn of a lever.

RENEWABLE SEAT AND PLUG—easily replaced; permits any desired trim for specific services.

REPAIRS ON THE JOB—can be completely overhauled without removal from line; no special tools or skill required.

EASY OPERATION—requires less operating effort than other valve designs.

FORGED STEEL—all parts, including body for most sizes, are press or drop forged from specification materials.

Cameron IRON WORKS, INC.

P. O. BOX 1212 HOUSTON, TEXAS

EXPORT: 74 TRINITY PLACE, NEW YORK, N. Y.

XUM

Built to Cut Maintenance

EASIER MAINTENANCE PROCEDURES and lower maintenance costs are important features of this brand new line of large motors. One man can perform all routine maintenance procedures, including opening up the motor for cleaning. Bearing surfaces are not exposed to abrasive grit and dirt during cleaning operations.

The appearance of this new line of large motors reflects the advanced design and fine workmanship that goes into their manufacture.

A well-braced, sturdy fabricated steel frame with cast-iron end brackets rigidly support and protect working parts. Ventilating openings are large to provide adequate cooling air at low velocities with resultant low sound level.

Wide Range of Sizes

These new design Allis-Chalmers drip-proof and splash-proof squirrel-cage induction motors are built in sizes from 60 hp at 300 rpm to 1500 hp at 1800 rpm. Ask your Allis-Chalmers representative to show you the details of this exceptional new motor or write for Bulletin 05B6112.

How's This for Accessibility

One man can remove the end brackets and air baffles and reach right inside motor with his vacuum cleaner or air hose. Bearing remains sealed against abrasive dirt throughout the cleaning operation.

Large air discharge openings with removable louvers allow plenty of room to get in with an electric drill for doweling and bolting the motor to the base. Plenty of room to reach up back of the stator core for cleaning.

A-3179

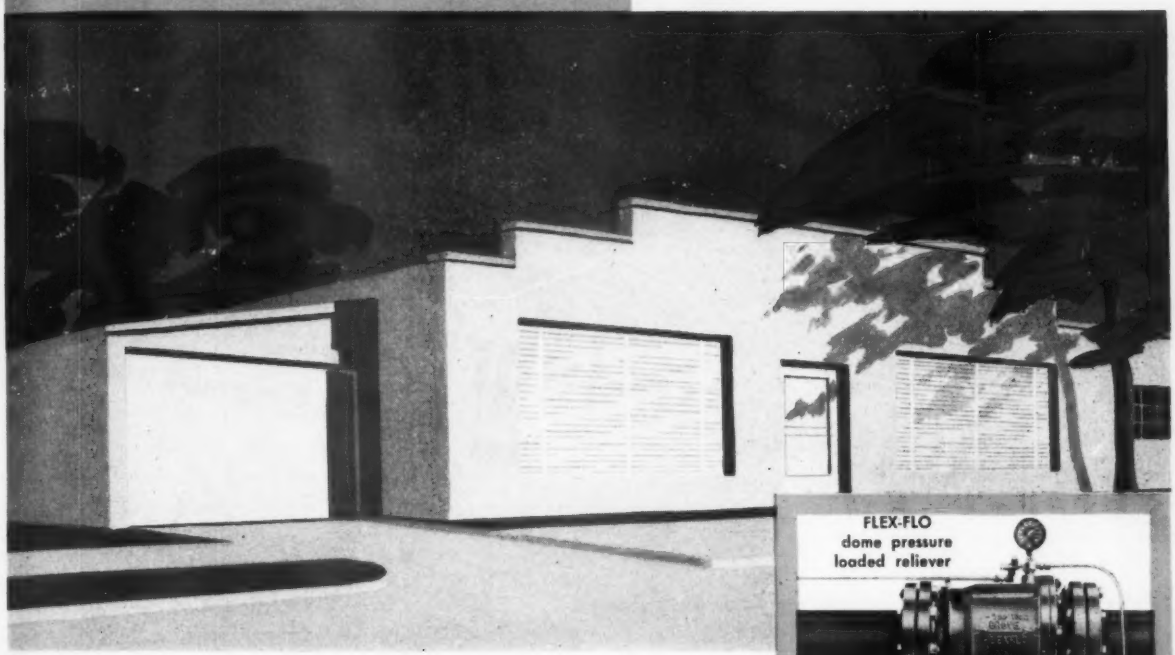
ALLIS-CHALMERS, 1059A SO. 70 ST.
MILWAUKEE, WIS.

ALLIS-CHALMERS

NOW

GROVE

Serves the Southwest Better



NEW SOUTHWESTERN DIVISIONAL HEADQUARTERS AT HOUSTON

This new, larger office and warehouse space which Grove now occupies at 1901 Calumet St., Houston, permits faster delivery from more complete Houston stocks. Grove pressure and flow control equipment bring the economy of dependable operation and long, trouble-free life to the producing and pipe-line divisions of the Petroleum Industry.

GROVE REGULATOR COMPANY

1901 Calumet St., Houston 4, Texas • 6529 Hollis St., Oakland, Calif.
1930 W. Olympic Blvd., Los Angeles, Calif.

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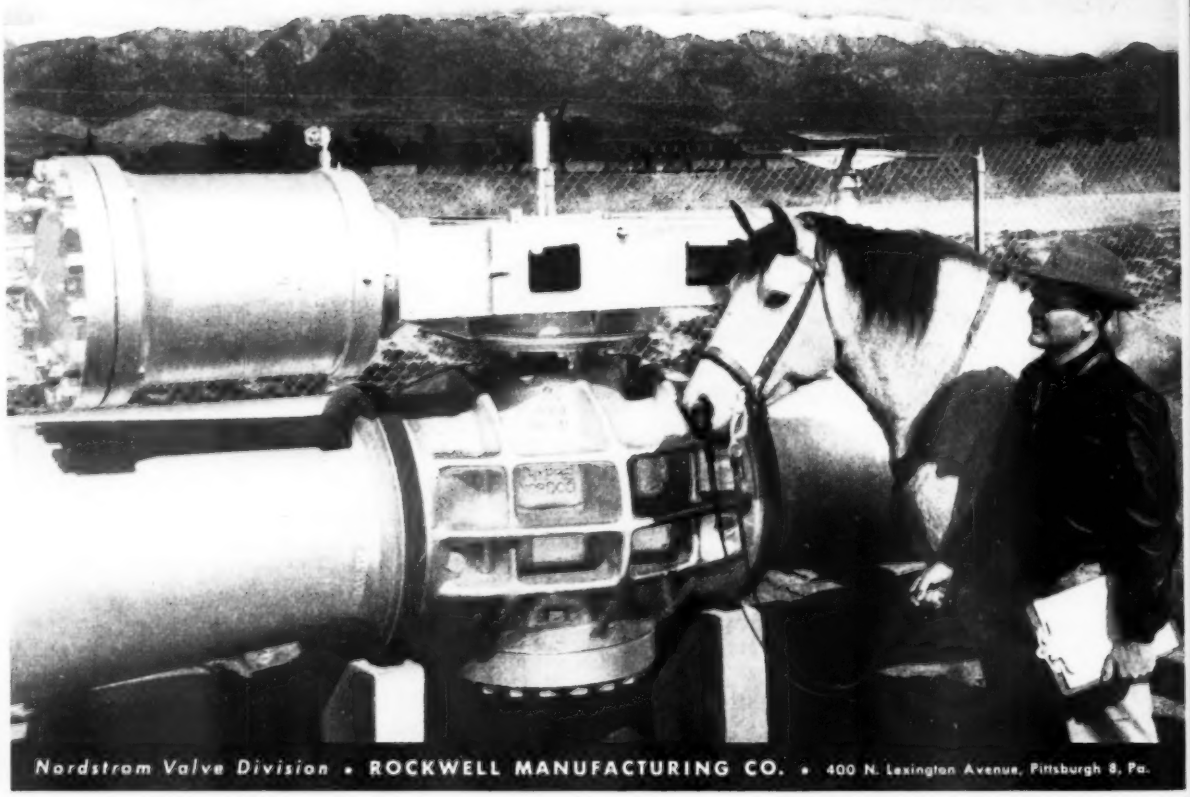
Nordstrom Valves
SERVING THE
PIPE LINES OF AMERICA

ROCKWELL

Automatic closing
for pipe line emergencies

Automatic lubrication
for finer performance



Nordstrom Valve Division • ROCKWELL MANUFACTURING CO. • 400 N. Lexington Avenue, Pittsburgh 8, Pa.

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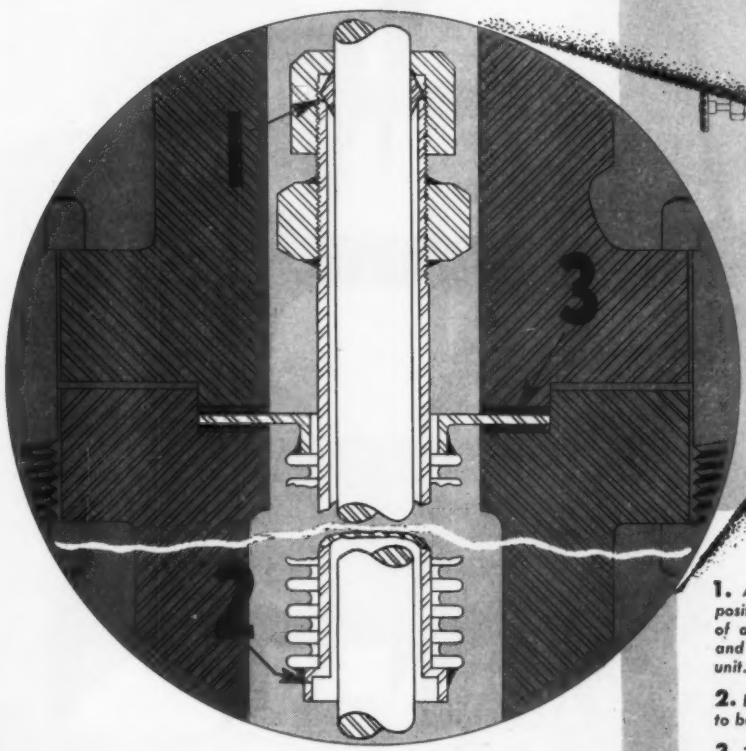
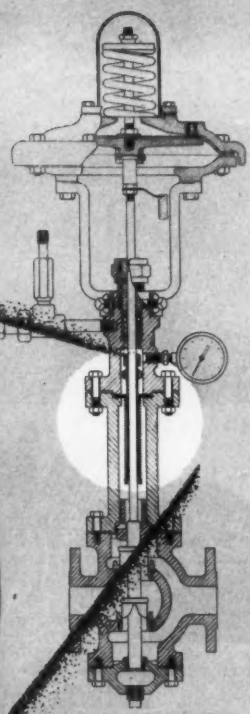
XUM

NOW! Stabilflo Valves with NEW, POSITIVE BELLOWS-SEAL





● Here's an automatic process control valve with a positive, safe, yet *simply-constructed* seal . . . for use wherever toxic, corrosive or precious fluids are involved. The Foxboro Stabilflo Valve is now available with a new-design, bellows-sealed valve stem. Instead of the conventional stuffing box, the packless bellows assembly makes a positive seal between the valve stem and valve body. The bellows expands and contracts with reciprocating action of valve stem.

Over the past nine years, Foxboro has pioneered in the development and application of bellows-sealed control valves for *special* jobs. This improved design is the outcome! It removes bellows-sealed valves from the class of "specials" because of its unique simplicity.

FEATURES

1. *A close-clearance liner guide is positively sealed to valve stem by means of a stainless steel compression ferrule and locknut. Stem and liner move as unit.*

2. *Bottom of liner guide is seam-welded to bottom of bellows.*

3. *Top of bellows is seam-welded to flange, which in turn is gasket-sealed between valve bonnet and bellows housing.*

Bellows assemblies are made of Type 347 Stainless Steel. *Replacement involves only the bellows and ferrule . . .* readily accomplished in field.

The new-design bellows-seal assembly can be applied to any standard Stabilflo Valve in sizes through 4 inches.

See how many advantages involving safety and economy are offered you by this new development. For complete details write **The Foxboro Company, 60 Neponset Avenue, Foxboro, Mass., U. S. A.**

FOXBORO REG. U. S. PAT. OFF. INSTRUMENTATION

XUM

LE GRAND Pumping units

Gear Boxes, Double Helical, Double Reduction, built to A.P.I. Specification.

LE GRAND'S units range from 3,000 lbs., Polished Rod Load with intermediate sizes up to 31,000 P.R.L.

LE GRAND'S manufacture in England under licence the products of OIL CENTER TOOL CO., Houston, Texas, U.S.A.

LE GRAND SUTCLIFF & GELL LTD

SOUTHALL, MIDDLESEX, ENG. ROCHESTER, KENT, ENG.

Telephone : Southall 2211 Telegrams : Legrand, Southall.
Codes : A.B.C. 6th Edition.

OILFIELD EQUIPMENT MANUFACTURERS & FOUNDERS

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BIGGEST REGULATOR *value...*

HIGH PRESSURE REGULATOR

...thanks to the economy and service-ease of **REPLACEABLE VALVE CHAMBERS**

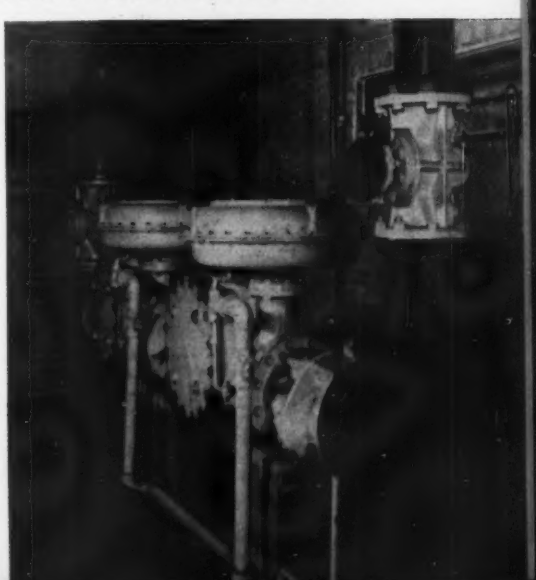
done in a jiffy!

It's no trick to replace a worn or out-size valve chamber in a Rockwell-Emco regulator. This unit is easily removed through a hand-hole plate in the side of the body *while the regulator remains in the line.* A new or rebuilt replacement valve chamber having either hard or soft seats readily bolts in its place.

If desired, the capacity of the regulator can be reduced by substituting a smaller size valve chamber having identical bolt circle dimensions in the same regulator body.

This exclusive interchangeability feature is common to both high and low pressure Rockwell-Emco balanced valve regulators. It brings you important savings in service and flexibility of application. To learn full details write for Bulletins 1006 and 1055.

LOW PRESSURE REGULATOR



ROCKWELL-EMCO

***Balanced Valve* REGULATORS**

FOR NATURAL, MANUFACTURED AND LP-GAS SERVICE

XUM

KEEPING THE *sure*
in measurement

Large capacity meter setting in Texas. No. 4 Rockwell-Emco meter with Combined Record Gauge (under protective housing) on lines controlled by Rockwell-Emco low pressure balanced valve regulator and Nordstrom valves.

Rockwell metering does it

When you buy Rockwell-Emco large capacity meters you get sustained accuracy and engineered durability. These qualities have been field proven for many years. The *plus* value you gain comes from *service economies* made possible by the bowl type body with its removable and interchangeable valve plate mechanism. This exclusive construction brings big savings to you who use big meters. For complete details write for Bulletin No. 1003.

PITTSBURGH EQUITABLE METER DIVISION
ROCKWELL MANUFACTURING COMPANY
PITTSBURGH 8, PENNSYLVANIA
Atlanta • Boston • Chicago • Columbus • Houston • Kansas City
Los Angeles • New York • Pittsburgh • San Francisco • Seattle • Tulsa

Meters

TIN

ALUMINUM

CAST IRON

PRESSED STEEL

Regulators

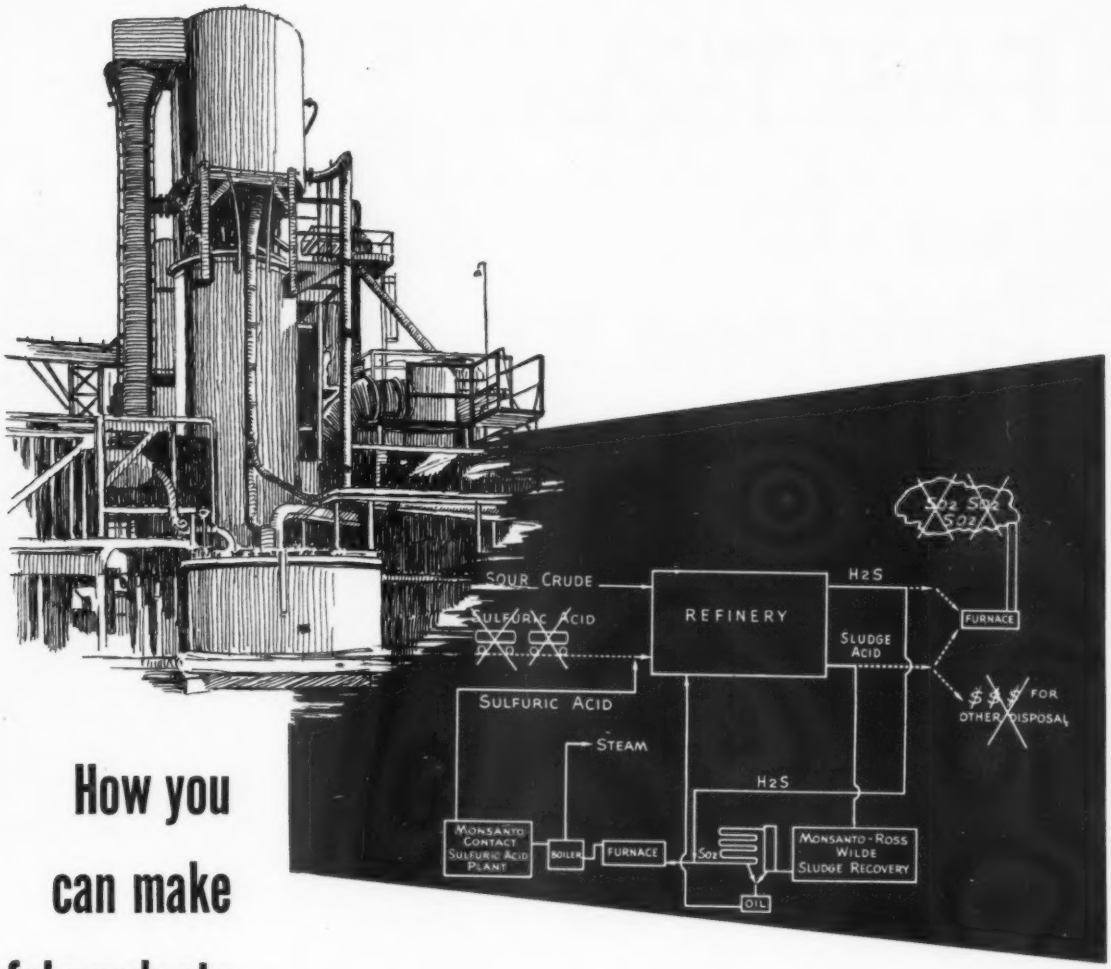
APPLIANCE

SERVICE

"1001"

BALANCED VALVE

There's a **ROCKWELL · EMCO METER & REGULATOR** for every use



How you can make useful products from refinery sludge

You can turn *any type* of fluid refinery sludge into useful products by the installation of a Monsanto-Ross Wilde sludge recovery unit to work with your sulfuric acid plant. In addition to making money, such installation will solve your sludge and H_2S disposal problems and improve your community relations by eliminating air and stream pollution.

If you do not have a contact sulfuric acid plant, Monsanto will build one for you that will handle SO_2 from the Monsanto-Ross Wilde installation and from any H_2S you may have.

Monsanto-designed plants, equipped with automatic controls which practically eliminate manual operation, will process any type of fluid refinery sludge. The only requirement is that sludge be reasonably free-flowing. Highly viscous sludge often can be mixed with that which is more fluid to get a usable consistency.

If you have problems of sludge and H_2S disposal and want to solve them by turning such refinery wastes into money, call in a Monsanto representative to survey your problem and explain how easy and economical it is to install Monsanto-Ross Wilde plants. For prompt action, mail the coupon, write or wire MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1745-H South Second Street, St. Louis 4, Missouri. FREE BOOKLET gives details on sludge acid recovery. Mail coupon for your copy.

MONSANTO
CHEMICALS — PLASTICS

MONSANTO CHEMICAL COMPANY
Organic Chemicals Division
1745-H South Second Street, St. Louis 4, Missouri

Please send: .....Monsanto representative to survey our sludge acid and H_2S disposal problems;
.....Booklet on sludge acid recovery.

Name.....*Title*.....

Company.....

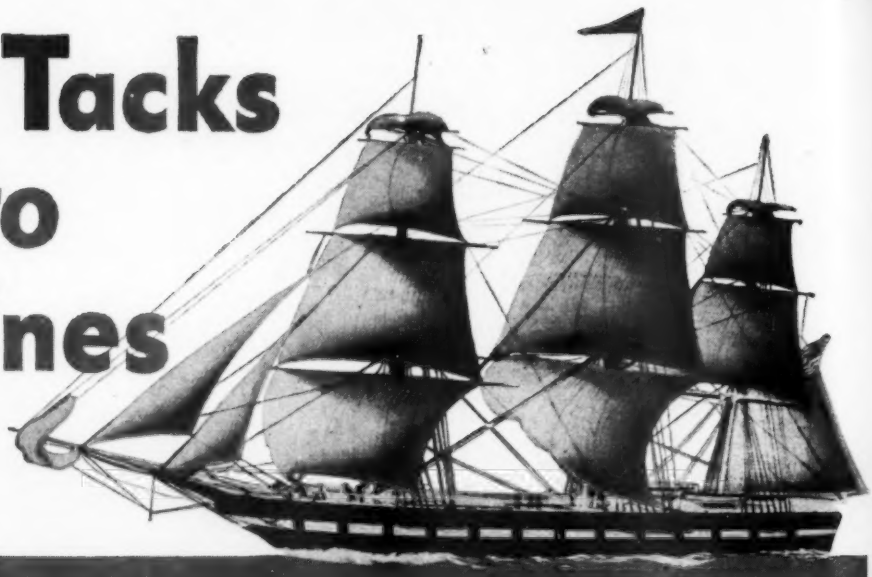
Street.....

City.....*Zone*.....*State*.....

SERVING INDUSTRY . . . WHICH SERVES MANKIND

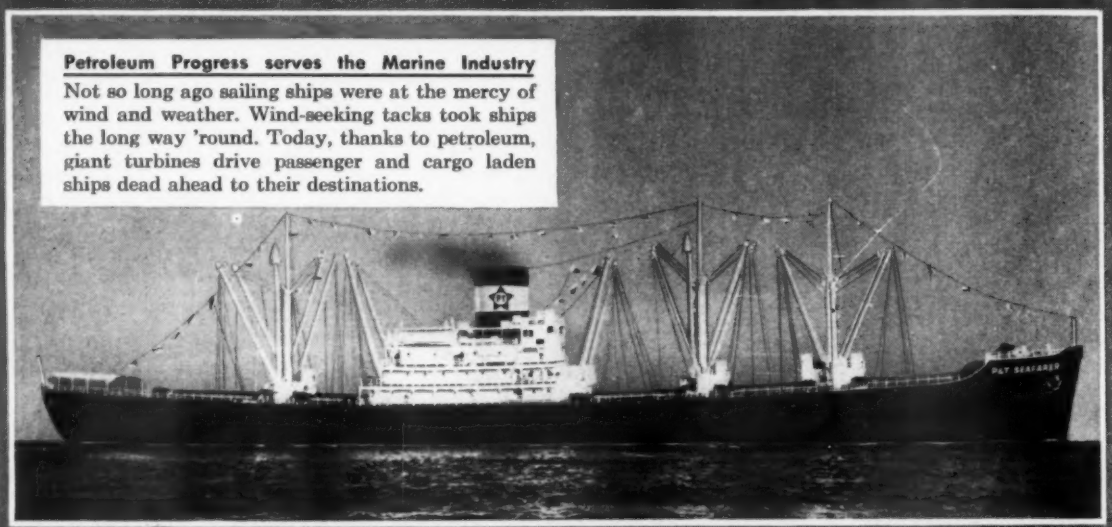
XUM

From Tacks to Turbines



Petroleum Progress serves the Marine Industry

Not so long ago sailing ships were at the mercy of wind and weather. Wind-seeking tacks took ships the long way 'round. Today, thanks to petroleum, giant turbines drive passenger and cargo laden ships dead ahead to their destinations.



The American Merchant Marine, born in 1607, grew to an all-time high in 1945, operating more than 25 million gross tons. Throughout the world, specialized marine fuels and lubricants help maintain this essential, economic lifeline.

OIL beats the wind! Sails were augmented by paddle wheels and then propellers. Wooden ships were replaced by ships of iron and steel. Huge turbines now furnish power, speed and dependability.

At ports around the world Texaco fuels and lubricants are taken aboard, relied on for economical, efficient, on-schedule operations.

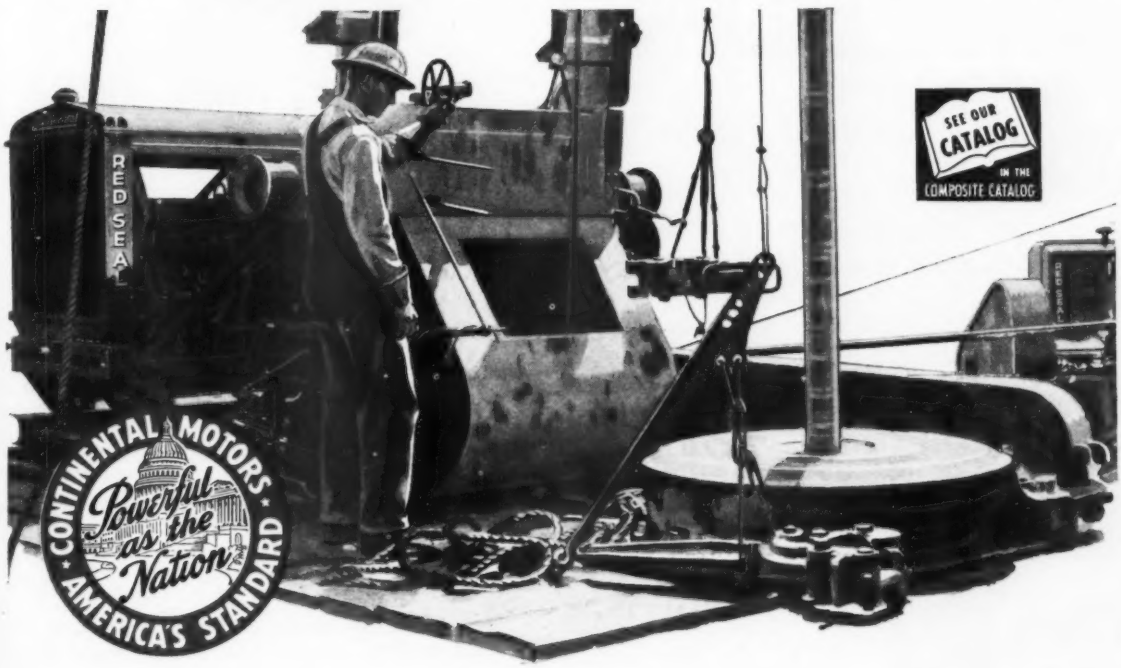
The marine industry has always been a major force in building and defending America. Petroleum research has contributed mightily to this vital maritime network of shipping and transportation.

THE TEXAS COMPANY

Petroleum Promotes Progress

TEXACO

CONTINENTALS GIVE YOU ALL THE THINGS that add up to DEPENDABLE POWER



By standardizing on Continental Red Seal engines in the oil field, you get ALL THE THINGS that add up to dependable oil field power:

QUALITY assured by nearly 50 years' experience in the internal combustion field.

ENGINEERING with your specific applications in mind.

SPECIALIZATION that does away with hit-or-miss matching to the job.

PARTS INTERCHANGEABILITY for quick replacement, with minimum down-time.

And last, but by no means least, *service from coast to coast.*

There's a Continental Red Seal engineered and built for almost every application in drilling, processing, and dozens of standby uses. Overhead-valve and L-head models for use with all standard fuels are available as bare engines or as power units, open or closed. Ask your dealer, or write for full information.

YOU MAY NOT NEED SERVICE FOR YEARS, BUT IT'S GOOD TO KNOW THAT WHEN YOU DO, IT'S AS NEAR AS YOUR PHONE

Continental Motors Corporation

MUSKEGON, MICHIGAN

6218 CEDAR SPRINGS ROAD
DALLAS 9, TEXAS

3817 S. SANTA FE AVENUE
LOS ANGELES 58, CALIF.

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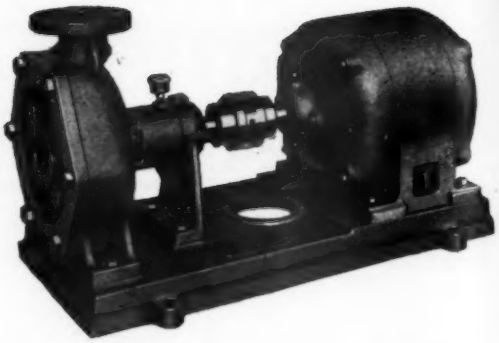
Transit Type CS Pumps

FOR CHEMICAL, PROCESSING AND GENERAL SERVICES



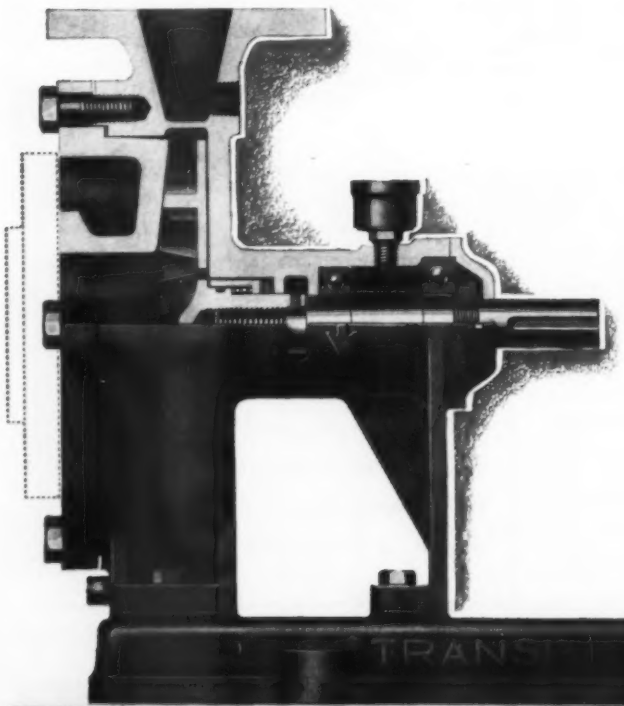
Max. working pressure 200 ppsi, 200 °F., 150 lb. Flange Drilling.

Capacities up to 550 G P M, differential heads to 160'.

Designed to give maximum strength, dependability, efficiency, and simplicity at minimum cost.

Ask for Bulletin 6100.

For Higher Pressures, Capacities and Temperatures, ask for Bulletin 6000, Transit Type ES.



COMPARE THESE FEATURES

1 **A balanced mechanical seal** which can be repaired from impeller end without making any precision measurement and without disturbing the shaft, bearings, coupling, driver, or discharge piping.

2 **Supported directly under the case** for maximum strength and freedom from piping strains.

3 **Case and bearing bracket are one integral casting** of the same metal for maximum strength, true alignment and 100% corrosion protection.

4 **No threads, and minimum number of parts exposed to the line fluid.** All parts can be furnished in any metal or alloy which can be cast and machined.

5 **Totally enclosed stainless steel clad case gasket** which can be reused many times.

6 **Extra heavy cases and impellers** for liberal corrosion and erosion allowances.

7 **The least number of parts per pump and the maximum interchangeability of parts between sizes.** Six sizes with all parts interchangeable except case, end cover and impeller.

8 **Extra heavy shaft and bearings** with running clearance easily adjusted for maximum efficiency.

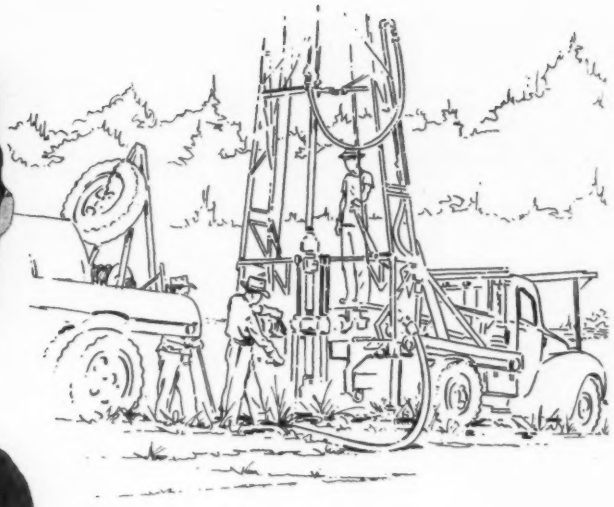
9 **Discharge nozzle** is vertical and is located at center of pump for venting and to simplify piping.

10 **Minimum floor space** required.

NATIONAL TRANSIT PUMP AND MACHINE CO.

Home Office and Works, OIL CITY, PENNA.

CHICAGO, 624 South Michigan Ave. • CLEVELAND, 702 Marshall Building • HOUSTON, Room 522 West Building
SAN FRANCISCO, 607 Market St. • NEW YORK, 30 Rockefeller Plaza • PHILADELPHIA, 2324 Fidelity Phila. Trust Bldg.
PITTSBURGH, 912 Farmers Bank Building • TULSA, 318 East Archer • LOS ANGELES, 2068 East 37th Street



A. D. DUNLAP, Party Chief of crew 3, with 16 years of service to IX clients, got his first job on a seismograph crew before the ink on his Rice diploma was thoroughly dry. From September 1933, he worked his way up ... helper to shooter ... to observer ... computer, before his promotion to party chief. The average seismograph experience of an IX Party Chief is 15 years. His long continuous service with the Independent Exploration Co. organization, and natural aptitudes for exploration work typifies the skill and field work knowledge IX's clients find valuable.

They know their jobs from the ground down

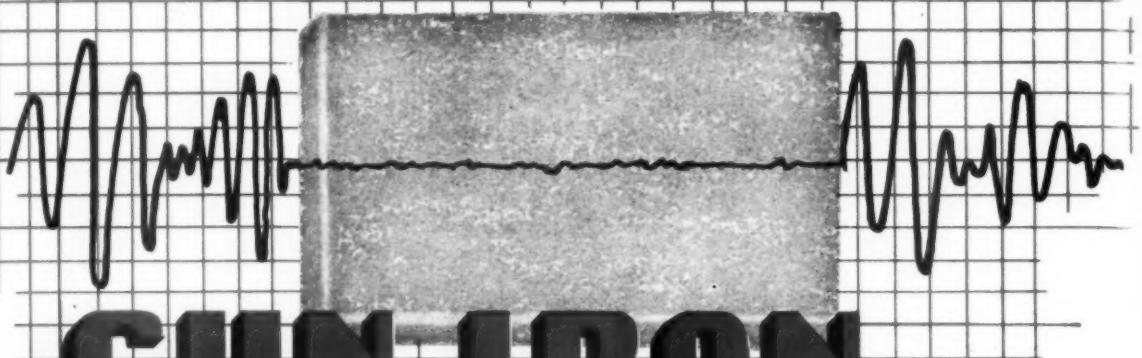
Independent's experienced field crews can make your exploration program more profitable. The average experience of Independent's party chiefs is 15 years and every party chief is thoroughly trained in every phase of geophysical prospecting. The result is systematic field procedures, avoidance of lost motion, and thorough computation methods that give Independent clients unsurpassed accuracy and rapid service.

POINTING THE WAY
IXC
FOR THE DRILL

Independent
EXPLORATION COMPANY
Geophysical Surveys
ESPERSON BUILDING HOUSTON, TEXAS

XUM

To damp vibration . . .



GUN IRON CASTINGS

IN designing machinery and equipment of all types, it is important to keep vibration at the minimum for maximum accuracy and for longest life of working parts. That is one of the reasons that Gun Iron is often chosen for machine tool castings . . . its dense microstructure has unusual damping effect on vibration. Another important factor is that Gun Iron does not change materially in high heat . . . at 900° F., it grows only ¼ of 1% in linear measurements. It has remarkable impact strength and many other properties superior to those of other irons.

Another important consideration for selecting Gun Iron is the unusual facilities found at Hunt-Spiller for producing large, accurate cast parts. Complete engineering, metallurgical and laboratory facilities are at your disposal to help you in design and operating problems. Complete quality control is assured because Gun Iron is produced in our own air furnaces, cast in our modern foundry and even can be machined in our extensive machining plant.

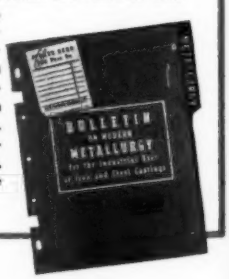
Whether your cast parts must damp vibration, resist frictional wear, prolonged heats and pressure or just be uniform in chemical and physical properties, it will pay you to investigate Gun Iron. Gun Iron has been doing an outstanding job on the toughest casting assignments for over 139 years.

GUN IRON *in the* PETROLEUM INDUSTRY

Hunt-Spiller casts and machines many parts for the petroleum industry. A few are listed below:

LINERS, PISTONS AND RINGS FOR HOT OIL PUMPS • BUBBLE CAPS AND TRAYS • TUBE SUPPORTS • PRESSURE CASTINGS

Chances are that there are many other places where Gun Iron can solve a design or operating problem. To help you determine the value of Gun Iron for your cast parts, our metallurgical department has prepared a comprehensive bulletin which contains complete properties and discussions of Gun Iron and many other metals. Engineers claim it an invaluable reference aid. Send for your free copy today.



HUNT • SPILLER GUN IRON • AIR FURNACE PROCESS • HSGI

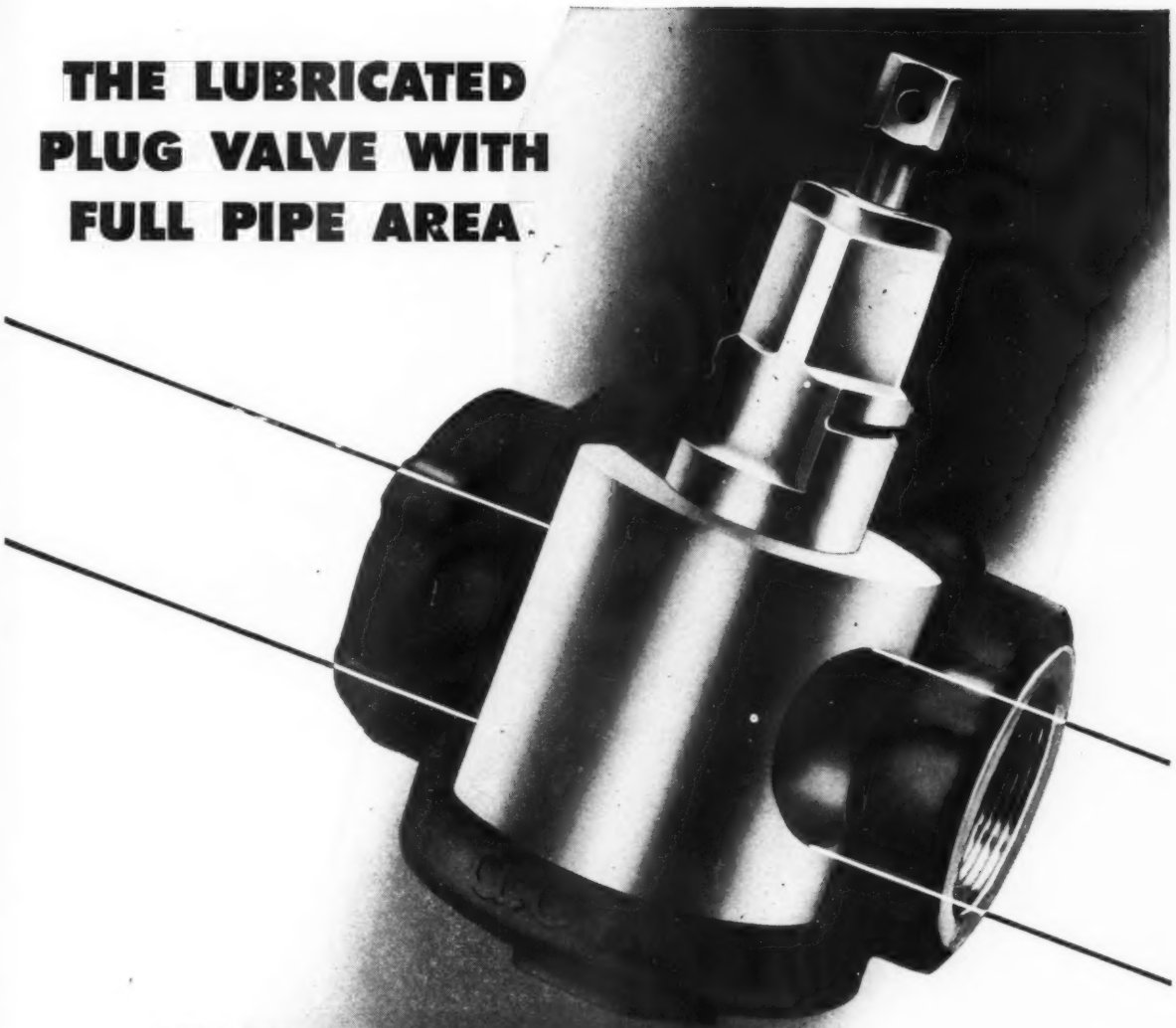
HUNT • SPILLER

MANUFACTURING CORPORATION

393 DORCHESTER AVENUE • SOUTH BOSTON 27, MASS.

Canadian Representatives: Joseph Robb & Co., Ltd., 4050 Namur St., Montreal 16, P. Q.

THE LUBRICATED PLUG VALVE WITH FULL PIPE AREA



a.c.f. CYLINDRICAL PLUG DESIGN

makes it possible. Straight-through openings result in smooth, non-turbulent flow, lowest head loss, reduced valve abrasion. Yet compact valve construction is retained in both rectangular and round-port types. Reason enough for a.c.f. Lubricated Plug Valve preference.

CYLINDRICAL FULL PIPE AREA LUBRICATED

a.c.f. PLUG VALVES

Representatives in more than 50 principal cities

Write for Catalog 4-OG, describing types and sizes, to: American Car and Foundry Company, Valve Division, 1501 Ferry Ave., East, Detroit, Mich.

XUM

Controlled
WELDED STEEL PIPE

SIZES 22" THROUGH 36" O.D.

WORTH

Assures
FASTER "FITTING-UP" AND "LAYING-DOWN"

Yes, "*absolute control*" *of every process* . . . from the proper selection of materials for charging our open hearths; the careful melting and pouring of ingots; the rolling and shearing of plates to exact size; the accurate rolling; the uniform welding; the hydraulic "expansion" and machined end-finish of pipe . . . all make possible the *excellent quality* of the finished pipe—and thus *Worth Control* does make for faster "fitting-up" and "laying-down" in the field.

FLANGED & DISHED HEADS
CARBON & STAINLESS-CLAD
STEEL PLATES

WORTH STEEL COMPANY • Claymont, Delaware

OCT

XUM

This Cast Steel Pressure Seal Gate Valve is one of many Powell designs specifically engineered for Power Plants
HORIZONS UNLIMITED!
Today, Powell Valves meet every requirement of American Industry for long-life, dependable flow control equipment. And, as new demands arise, Powell will make the right valves to satisfy them.
Powell makes valves specifically adapted to YOUR industry. The Complete Powell Line includes Globe, Angle, Gate, Check, "Y", Non-return, Relief and Flush Bottom Tank Valves, in Bronze, Iron, Steel and the widest range of Corrosion-Resistant metals and alloys ever used in valves.
PATENTED
POWELL
1500
STEEL
POWELL
The WM. POWELL CO., 2525 Spring Grove Ave., P. O. Box 106, Station B, Cincinnati 22, Ohio

XUM

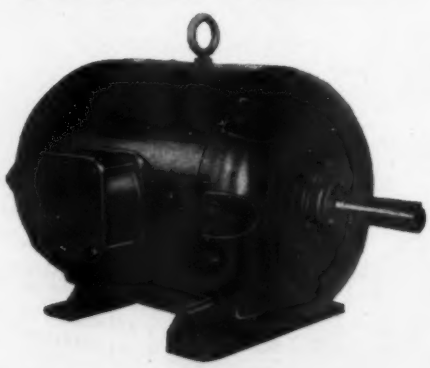
Wagner Explosion-Proof Motors Provide *Safe, Sure* Power for Refinery Pumps

The Wagner type HP Explosion-Proof Motors that power these pumps at a large Texas refinery are in continuous service 24 hours a day in an oil processing operation.

You'll find dependable Wagner type HP Motors on the job at major oil company plants throughout the world. There's a reason—type HP motors are especially designed to operate with safety and economy in surroundings where open-type motors might cause explosion. They are approved by Underwriters' Laboratories for Class I Group D hazardous locations . . . they are fully protected against adverse conditions so often found in oil fields . . . and they are always reliable.

If you need motors for use where explosive gases, fumes, vapors or combustible substances are present, investigate the safety and long life qualities of Wagner type HP Motors.

Twenty-nine branch offices, located in principal cities, are ready to help you whenever you have a motor problem. Users of Wagner Motors also profit by nationwide service facilities. Write for Bulletin MU-185 for information on the complete line of Wagner Motors.



Wagner Type HP Explosion-Proof Motor for hazardous location motor drives.

Wagner Electric Corporation
EST. 1891

WAGNER ELECTRIC CORPORATION
6389 Plymouth Ave., St. Louis 14, Mo., U.S.A.

ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES
AUTOMOTIVE BRAKE SYSTEMS — AIR AND HYDRAULIC

BRANCHES IN 29 PRINCIPAL CITIES

Power End That's All Muscle

- No Connecting Rod Bolts — assembled as a unit
- One-piece alloy steel crank on Timken Bearings
- American Roller Bearings on Connecting Rods
- Tool Steel helical gear and pinion, specially hardened.

New WHELAND

HP-14000 7½" x 14"

DUPLEX SLUSH PUMP

WHELAND

This new 350 h.p. Wheland Duplex Slush Pump is packed full of important features that mean extra strength, extra smoothness, greater accessibility, flexibility—dependability. Take Wheland's exclusive tie rod design. This feature means strength without weight or bulk. Wheland's tool steel helical gear and pinion are specially hardened to withstand shock and overloads. Connecting rods are one-piece—no bolts.

We could go on and on about the many features of this new Wheland pump—the main thing is for you to get acquainted with it so you can take advantage of its many operating economies next time you want to get the most for your pump money. Visit your nearest Jones & Laughlin Supply store or write us at Tulsa for complete details.

Member Petroleum Equipment Suppliers Association

Specifications

Horsepower—350

Discharge Pressure—
838 lbs. with 7½" liners;
1627 lbs. with 5½" liners

Normal RPM—60

Steel or Semi-Steel Fluid End Optional

80 Stores
17 Sales Offices
8 Resident Salesmen

"... here's **MY** warehouse!"

Jones & Laughlin Supply Company

Subsidiary of
Jones & Laughlin
Steel Corporation
TULSA, OKLAHOMA

J&L STEEL

Export: 405 Lexington Ave., New York, N. Y., U. S. A. Wheland Export: Lucey Export Corp., 233 Broadway, New York 7, N. Y., U. S. A. and Broad Street House, E. C. 2, London, England.

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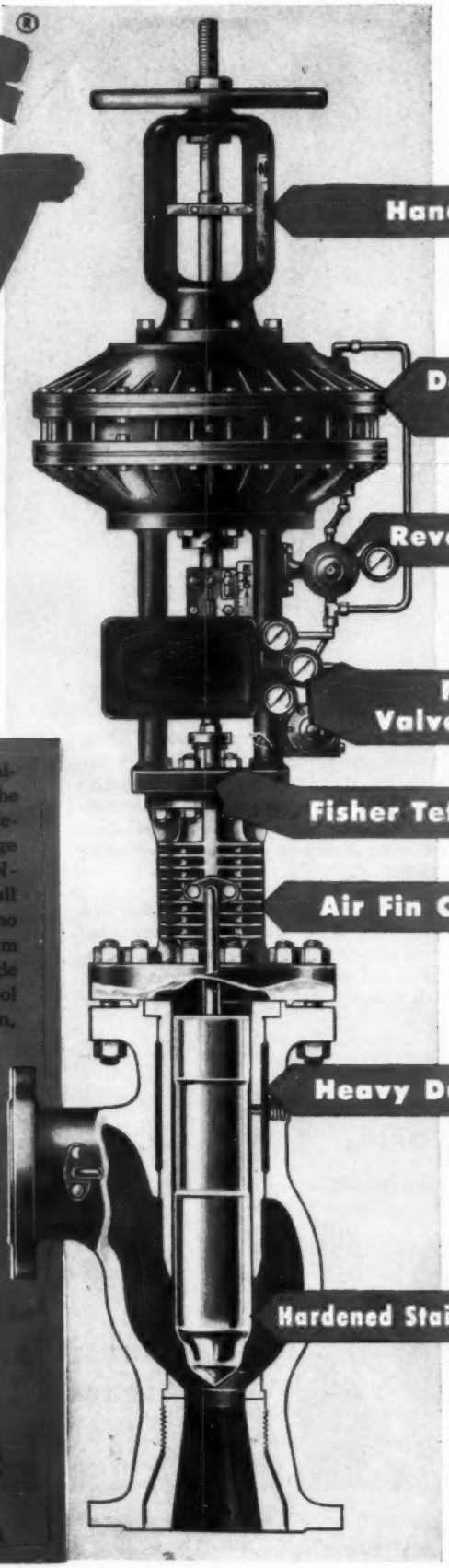
*AMT

DIAPHRAGM MOTOR VALVES



Hand Jack

For manually positioning inner valve. Allows manual operation for either opening or closing valve.

Double-Acting Diaphragm

Stem thrust power up to 5,000 lbs. at any point in its stroke without dead spot.

Reversing Relay

Performs additive or subtractive action to second diaphragm exactly opposite to pressure changes on primary diaphragm to allow full power thrust action.

Positrol Valve Controller

Insures accurate and fast positioning of inner valve.

Fisher Teflon Packing

Requires no lubrication.

Air Fin Construction

Heavy Duty Guiding

Assures positive inner valve alignment.

Hardened Stainless Steel Trim

Heavy duty guided inner valve for high pressure drop and tough corrosive or erosive service.

Fisher Type 5700 "AMT" pressure balanced diaphragm motor valves provide the extreme power to actuate large single-seated valves for tight shut off on large pressure drops up to 5,000 LBS. UNBALANCED FORCES. It features full pneumatic performance. No springs, no levers or weights. Double diaphragm avoids backlash effects probable with single diaphragm construction. Fisher Positrol accurately positions inner valve. In action, performance obtained with operating pressure up to 30 lbs. Designed for fast stroke action and high stability.

The "AMT" is also supplied in single diaphragm construction for open and closed position work.

WRITE TODAY FOR BULLETIN E-5700

*AMT

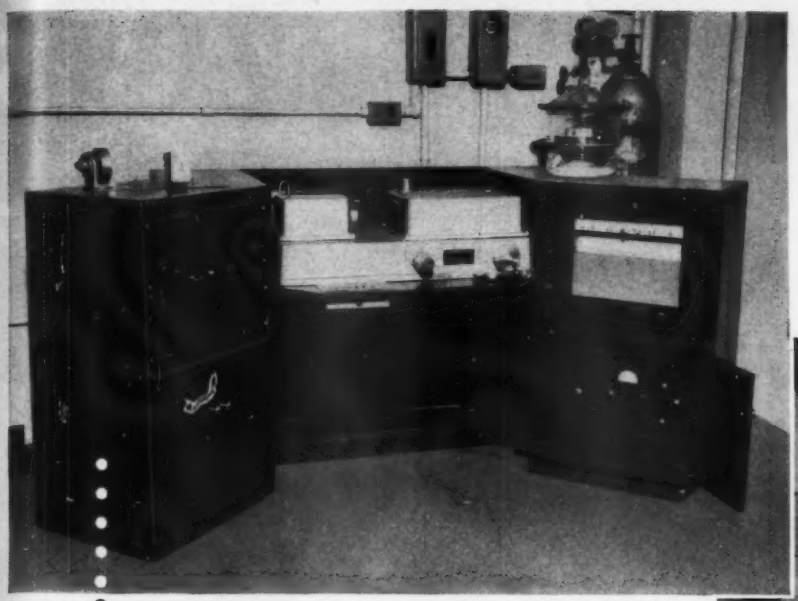
"Answers the Force," in action, pressures added to one diaphragm, subtracted from other.

FISHER GOVERNOR COMPANY

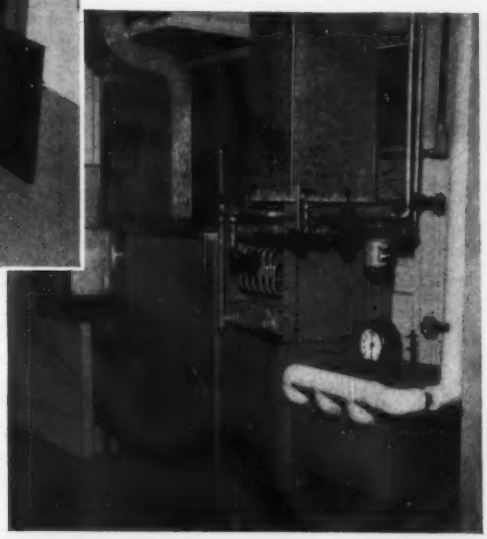
MARSHALLTOWN • IOWA

XUM

XUM



This infra-red analyzer at Houdry Process Corporation's laboratories, Philadelphia, is safeguarded against moisture by the Type CHG Lectrodryer shown below.



If you're working with INFRA-RED . . .

A wet atmosphere swallows up infra-red rays; doesn't let them through. So industrial and Government laboratories are installing Lectrodryers to eliminate this hazard and assure constant transmission of the infra-red. Salt prisms are sealed in DRY air and work is carried on in rooms where the atmosphere is maintained at a uniformly low moisture content.

Infra-red spectroscopic equipment may not be employed in your plant, but this use illustrates the degree to which DRYing does interest all industries.

Air gases and organic liquids entering into processes are being dried by Lectrodryers. Production is speeded up and kept on the beam. Constant high quality is maintained. Materials in storage are protected against injury by moisture.

May we show you what DRYing with Lectrodryers will do for you? Write Pittsburgh Lectrodryer Corporation, 325 32nd St., Pittsburgh 30, Pennsylvania.

In England: Birlec, Limited, Tyburn Road, Erdington, Birmingham.
In Australia: Birlec, Limited, 51 Parramatta Road, Glebe, Sydney.

LECTRODRYERS DRY WITH ACTIVATED ALUMINAS

LECTRODRYER

REGISTERED TRADEMARK U. S. PAT. OFF.

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Only IN W-K-M VALVES

When the valve is open, you have a round, smooth, full-bore opening entirely through the valve.

There is no gate cavity or pocket to collect sediment and prevent the valve from closing properly.

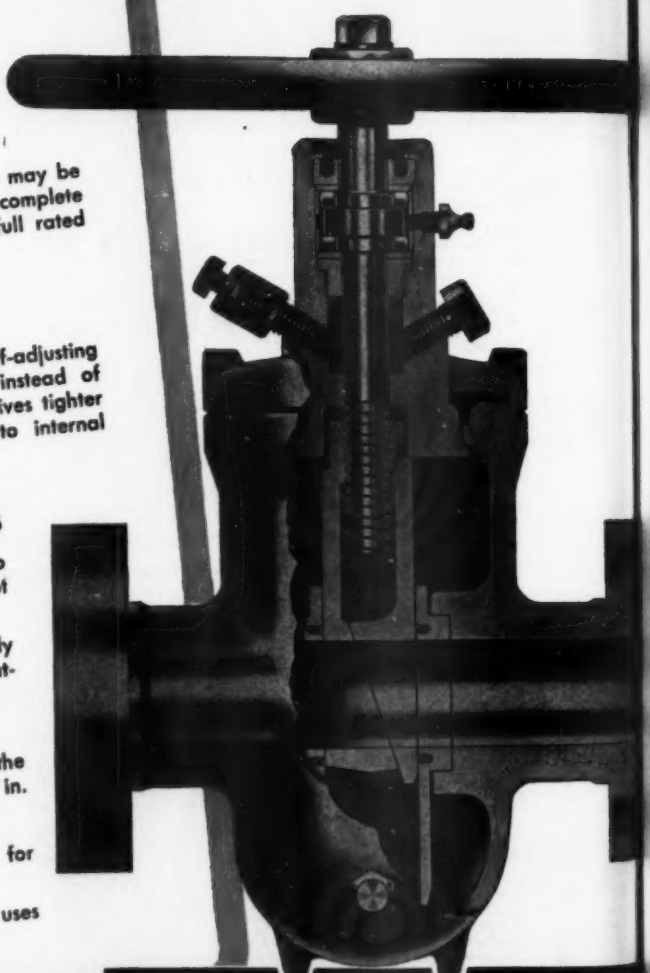
Nor are there any recesses or corners to cause swirling, churning or eddying . . . common sources of valve cutting.

Thus, the gate and the valve seats are protected against cutting or damage of any kind, whether the valve is open or closed.

The pressure is confined to the smallest possible area, the round opening through the valve. This allows the body and bonnet to be used as a grease reservoir and permits repacking the valve, or even removing the bonnet or changing the stem while the valve is under full rated pressure.

This is another of the several reasons why you may be sure that a W-K-M Valve will always effect a complete shut-off . . . will always open or close under full rated pressure.

This "THROUGH-CONDUIT" (PERFECT FLUID PASSAGE) Feature!



PRESSURE SEAL BONNET

Requires no flanges — no studs and nuts. Self-adjusting to pressure and temperature changes . . . instead of tending to push bonnet off, greater pressure gives tighter seal . . . considerably less area exposed to internal pressure.

PLUS THESE OTHER PROVED FEATURES

- Lubricant contained in entire body — no special lubricant required — seal does not depend on lubricant.
- Parallel expanding gates — seal directly across both seats with no distortion whatever — positive shut off both sides.
- Oversize bronze renewable seats.
- Combination wipe and seal rings keep the gate clean . . . pressure out . . . grease in.
- Chrome plated gates.
- Double roller thrust bearings on stem for ease of operation.
- Combination plastic-chevron packing — uses no gland or gland follower.

THIS IS THE NEW - IMPROVED W-K-M FLOW-LINE AND CHRISTMAS TREE VALVE

W-K-M Company

OIL FIELD, PIPE LINE & INDUSTRIAL EQUIPMENT

HOUSTON, TEXAS, U. S. A.

LOS ANGELES

Cable Address: "WILKOMAC"

Export Office: 30 Rockefeller Plaza, New York

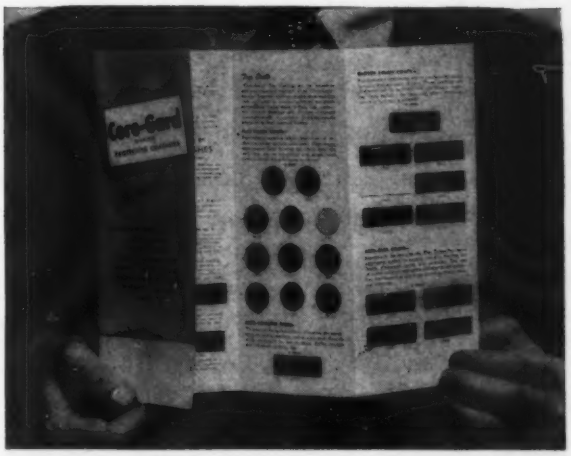
What's corrosion costing you?

Maintenance costs can be lowered with "Coro-Gard" Coating Systems

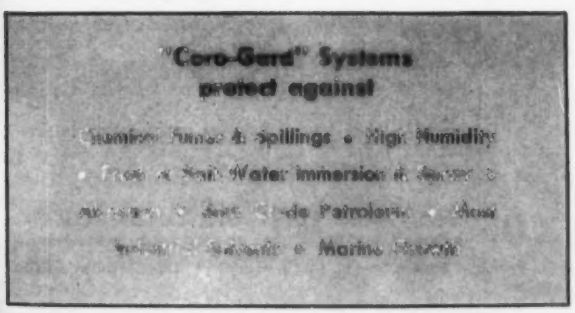
Every year millions of dollars worth of receiving tanks, pipelines, drill stems, heater-treaters and other equipment is rusted beyond repair by the acids in sour crude oil. Production time is wasted with expensive replacement.

"Coro-Gard" Anti-Corrosion Coatings are the answer to this old problem. These tough coatings are vinyl-based, oil-free and have high adhesion and lasting resiliency. *Adhesion* that resists corrosion undercutting—even if the coating's ruptured, and *resiliency* to absorb thermal and mechanical shock.

You can cut *your* corrosion losses with "Coro-Gard". Our engineers have prepared coating systems to satisfy every need. Write today.



FREE FOLDER! Gives actual samples of colors and finishes for 15 basic metal-protective coating systems. It shows how "Coro-Gard" cuts the cost of treating equipment, prolongs the interval between coating and re-coating. For FREE copy address: Adhesives & Coatings Div., Detroit. Dept. CE-105.



WHATEVER your corrosion problem, there's probably a "Coro-Gard" Coating System to save you time and money. Send for FREE sample folder showing 15 basic corrosion and abrasion conditions, and the "Coro-Gard" coatings that fit each need.

Made in U.S.A. by MINNESOTA MINING & MFG. CO., ADHESIVES AND COATINGS DIV., 411 Piquette Ave., Detroit 2, Mich. Also makers of "Scotch" Brand Pressure-sensitive Tapes, "Scotch" Sound Recording Tape, "Underseal" Rubberized Coating, "Scotchlite" Reflective Sheeting, "Safety-Walk" Non-Slip Surfacing, "3M" Abrasives. General Offices: Saint Paul 6, Minnesota.

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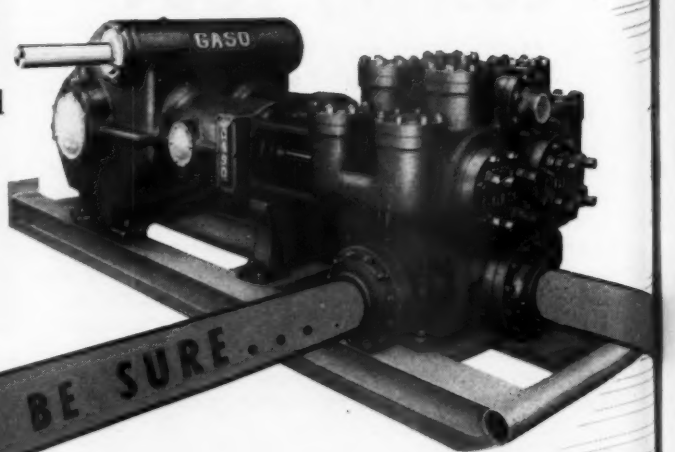
YOU CAN'T ARGUE WITH THE RECORDS

The Gaso business is built on records—the cold, hard cost records of users.

They tell a story of consistently lower pumping costs—per month, per year and per barrel.

What other reason would so many outstanding pipeline companies have for standardizing on Gaso Pumps?



SAY GASO . . . AND BE SURE . . .

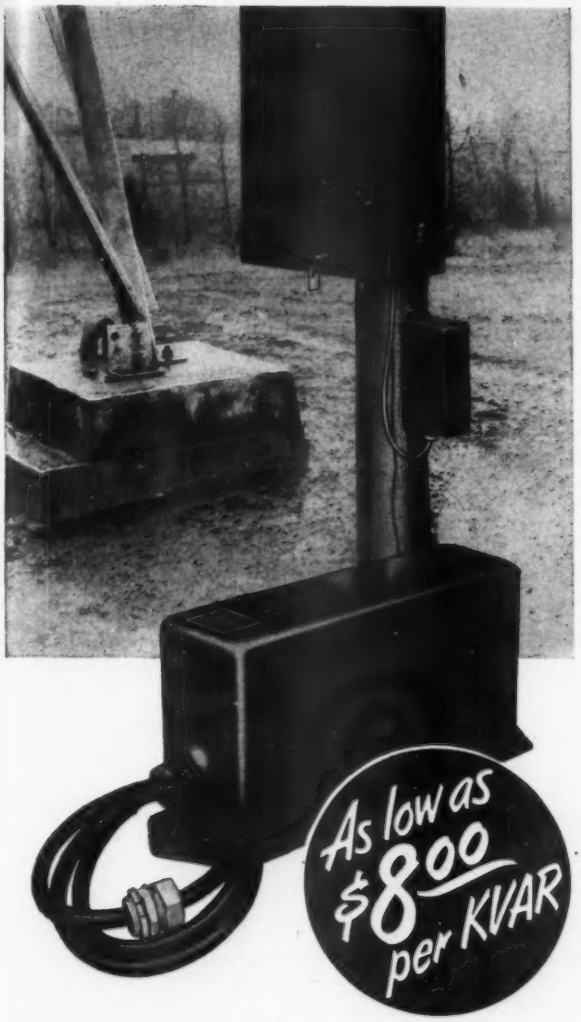
GASO PUMP & BURNER MFG. CO. 902 EAST FIRST ST., TULSA, OKLA.

EXPORT BRANCH: 149 BROADWAY, NEW YORK

Shreveport: W. L. SOMNER CO., 419 Lake Street • Los Angeles: 2529 Chambers St., Vernon • Western Canada: Loftus Machine Co., Ltd., Edmonton, Alberta

GASO PUMPS

for every oil industry need



NOW

a new line . . . at a new low price!

CAPACITORS

for outdoor oil-well pumping motors

Q. *What's new about these G-E outdoor capacitors?*

A. In this new line, they now match the kvar requirements of small oil-field pump motors more closely than ever before.

Q. *How does the new price compare with the old?*

A. Price per kvar is 20 to 50 per cent less than the special ratings previously available for outdoor capacitors. New list prices range from $48 to $92.

Q. *What ratings are available?*

A. Made for 3- to 15-hp motors, the capacitor ratings are 2, 3, 4, 5, and 6 kvar, for 460-volt, 3-phase, 60-cycle operation.

Q. *What extras do I need?*

A. None. Each unit comes complete with a 4-foot flexible, watertight cable which can be used with or without conduit. Heavy-gage steel case is also watertight and durably finished to resist rust and corrosion. Unit operates on motor-starter switch.

Q. *How are they mounted?*

A. Small size of unit and holes in end flanges permit quick, easy mounting on motor well pole or service pole for direct connection to motor starter.

For full information on these new outdoor capacitors, or any other oil-field electric equipment, contact your local G-E representative. *Apparatus Dept., General Electric Co., Schenectady 5, N. Y.*

HOW CAPACITORS CUT YOUR COSTS

Power factor is usually low in oil-well pumping because of the cyclic load of pumping jacks. The jacks are overmotored, which results in low field power factor. To improve power factor, capacitors are your best bet. Here are some of the advantages they can bring you:

Release system capacity Capacitors may enable your present distribution system to carry 20 to 30 per cent more load without added equipment. On new systems, they permit use of smaller transformers and conductors, which more than offsets capacitor cost.

Improve voltage level If voltage drop is a problem, or you must add more wells or larger motors to an already fully-loaded system, capacitors can inexpensively provide the needed voltage boost.

Reduce power losses This saving alone may mean a 10 to 20 per cent annual return on capacitor investments.

GENERAL ELECTRIC

407-195

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Now —

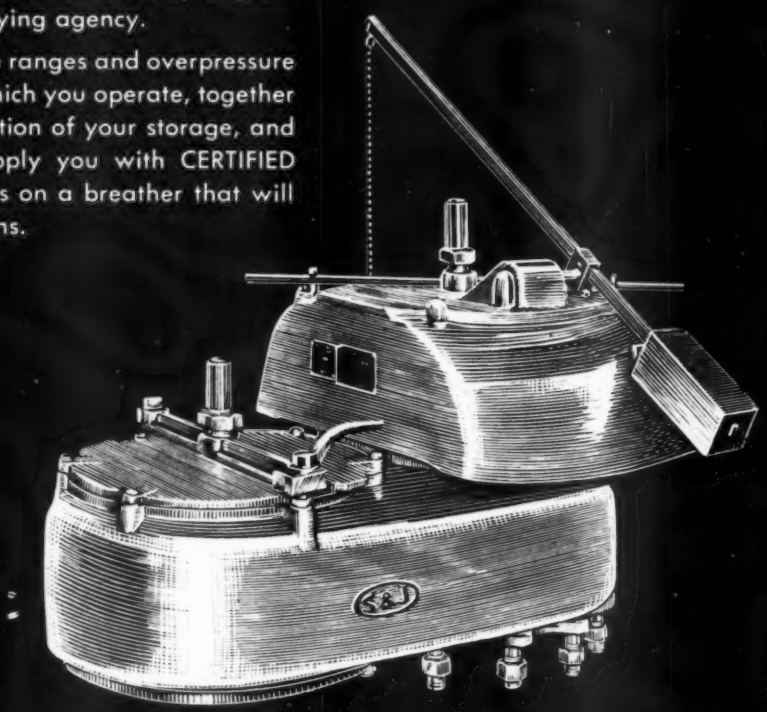
TOPS IN FLOW CAPACITY

We are pleased to announce our new series of Tank Breather Valves, Figure ST-6949, available in 4, 6, 8, 10 and 12 inch sizes. This new design provides tremendously increased flow capacities within the range of conventional pressure settings and overpressure tolerances.

This new series of breathers replaces our previous series, Figure ST-1949, and we believe that these new breathers provide the greatest venting capacities yet produced by anyone for the normally used, practical ranges. In addition, their manufacture is of superb quality, they are easily maintained, and their resistance to corrosion is unmatched.

These new S. & J. Breather Valves are certified for venting capacity when mounted and tested in exact conformance with A.P.I. Venting Standards, paragraphs 7.0 to 7.40 inclusive, by a qualified impartial certifying agency.

Give us the pressure ranges and overpressure tolerances under which you operate, together with a brief description of your storage, and we will gladly supply you with CERTIFIED flow capacity curves on a breather that will meet your conditions.

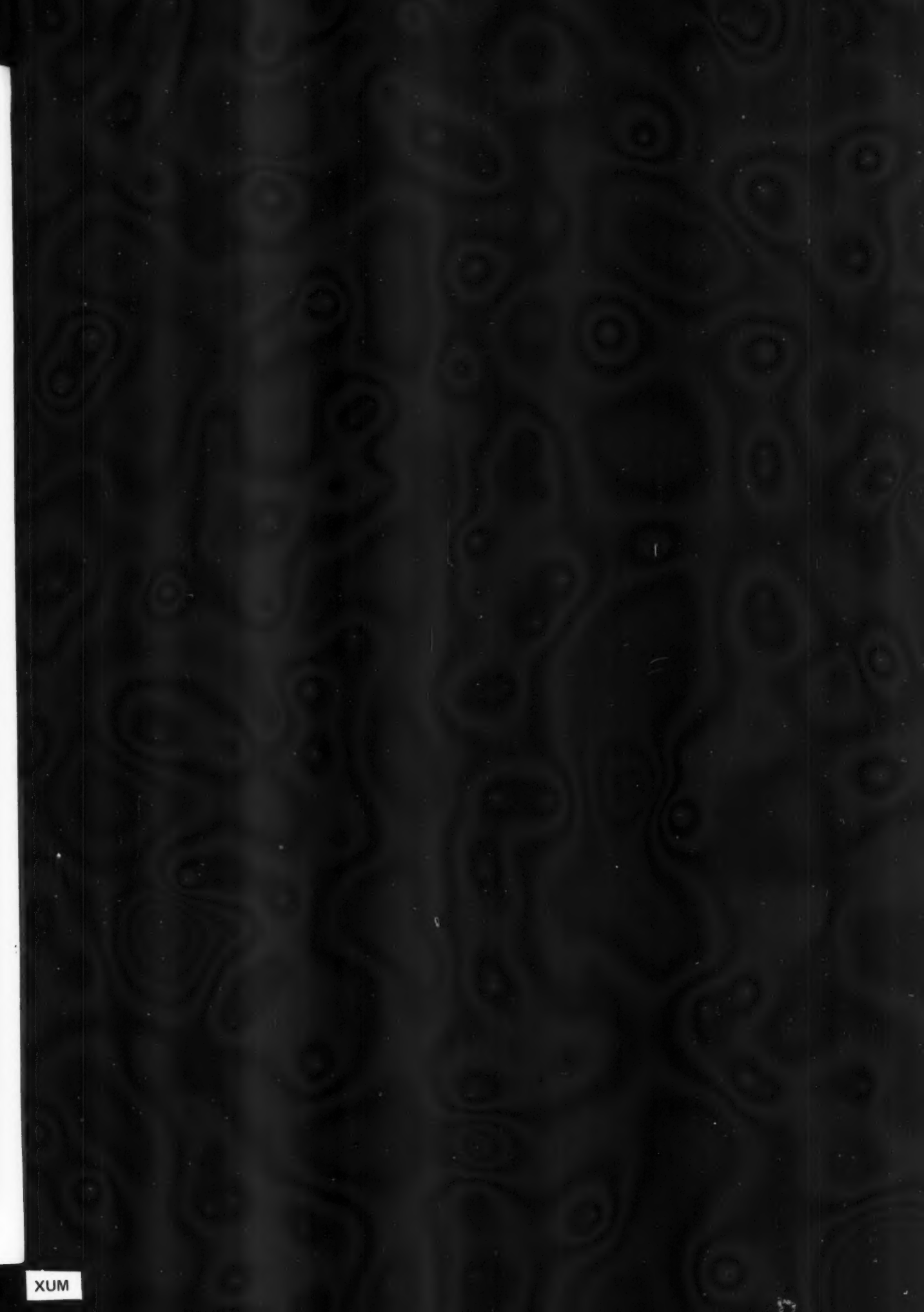


S&J

Shand and Jurs Co. 917 CARLETON STREET · BERKELEY · CALIFORNIA

NEW YORK 296 Madison Ave. · CHICAGO 332 So. Michigan Ave. · HOUSTON 814 M & M Bldg. · TULSA 310 Thompson Bldg. · LOS ANGELES 714 W. Olympic Blvd. · SEATTLE 3000 Western Ave.

MONTREAL 360 Notre Dame St. · VANCOUVER 550 Beatty St. · DARLINGTON England



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SERVICE

UNLIMITED

SUPPLY BOVAIRD COMPANY

Whatever you need—from tiny fittings to giant draw works—you'll find available for you at BOVAIRD'S. And you'll find every BOVAIRD store staffed with experienced, capable personnel to help you select the right supplies for your particular needs.

Put BOVAIRD'S 79 years of oil field supply experience to work for you. No order is too small or too large for BOVAIRD to fill quickly and efficiently.

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ILLINOIS—Clay City, Grayville, Salem
KANSAS—Chase, Great Bend, McPherson, Pratt, Russell, Wichita
OKLAHOMA—Duncan, Oklahoma City, Pauls Valley, Ringwood, Sapulpa, Seminole, Tulsa
TEXAS—Borger, Dallas, Midland, Odessa, Pampa, Snyder

PETROLEUM EQUIPMENT SUPPLIERS ASSOCIATION MEMBER

"Buy From Bovaird"

THE Bovaird SUPPLY CO.

GENERAL OFFICES
TULSA, OKLAHOMA

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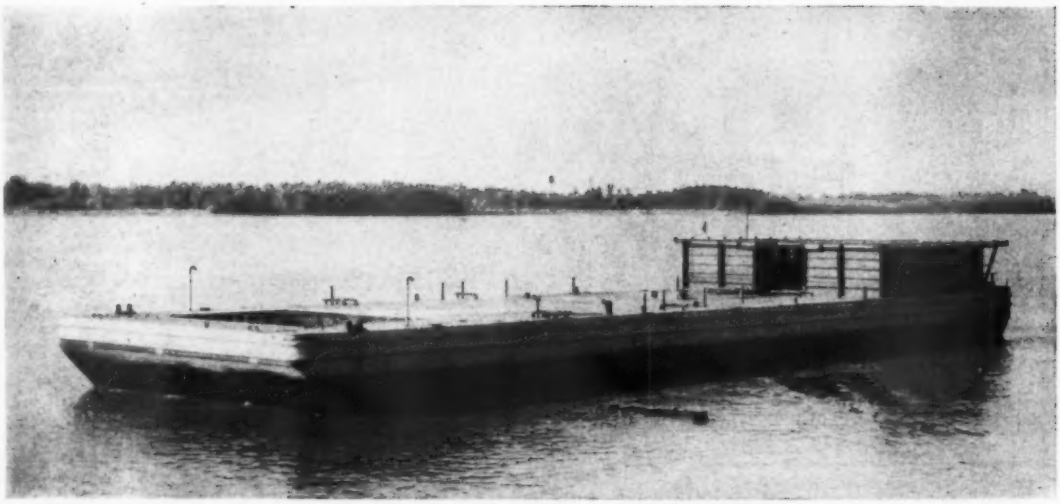
AVONDALE

BUILDS NEW DRILLING RIG



Built for Rowan Drilling Company, the huge barge is 200 feet long, 54 feet wide and 12 feet deep. It is a completely self-contained unit, with drilling equipment and power supply located on the same barge. The barge was launched exactly one month after the contract was signed and construction orders given. Frankly, such speed in this type of construction was possible because AVONDALE workers, skilled in steel, are thoroughly experienced in drill rig construction.

STEEL

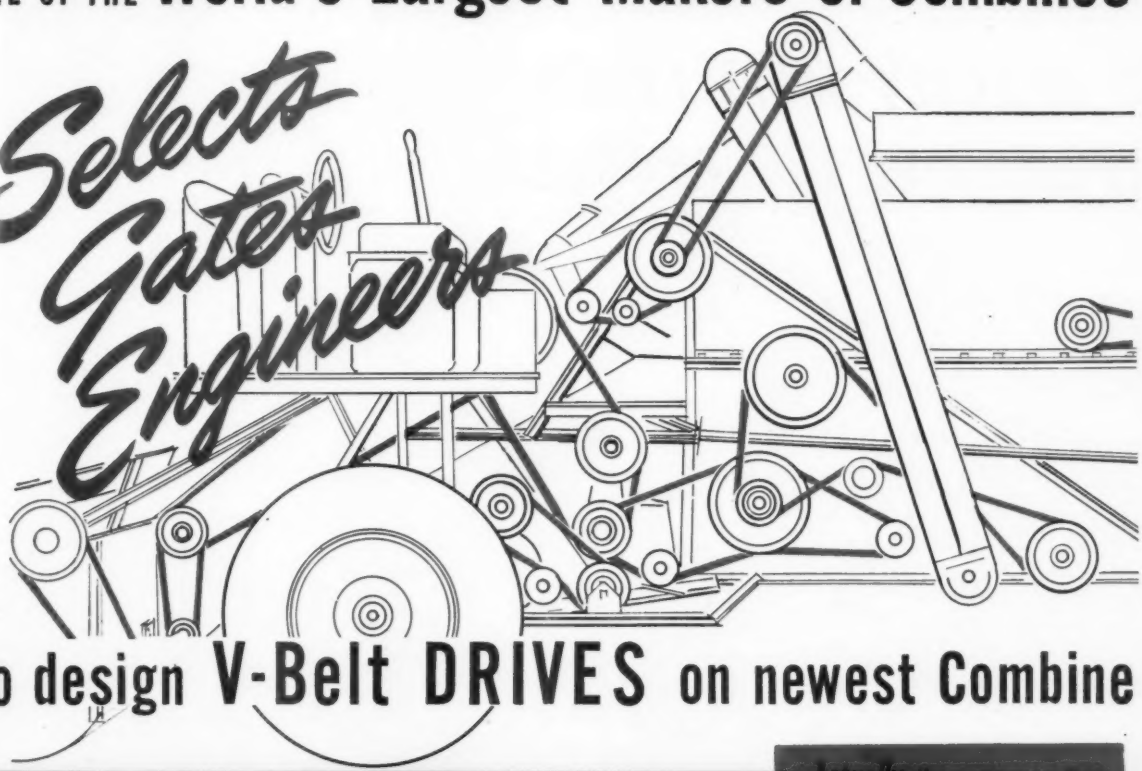
AVONDALE MARINE WAYS, INC.

RIVER FRONT, MAILING ADDRESS: NEW ORLEANS DISTRICT WESTWEGO, LOUISIANA

MAIN PLANT: AVONDALE, LA.
QUICK REPAIR PLANT — HARVEY, LA.

ONE OF THE World's Largest Makers of Combines

Selects Gates Engineers



to design V-Belt DRIVES on newest Combine

A Completely V-Belt Driven Combine ...
Every drive of the most advanced design

In order to reduce the wear and tear of operating his combine, the manufacturer wanted every moving part that was subject to shock to be "cushioned" by the **shock-absorbing** properties of a V-belt Drive—and he wanted to be sure that every V-belt Drive embodied the most advanced engineering design.

He knew that the Gates V-Belt testing laboratories are by far the largest in the world—that Gates runs an average of 32,000 hours of testing every **week** on V-Belts alone! (32,000 hours is equivalent to five years of life for one belt.)

And he knew that Gates hadn't stopped with testing—that Gates Research Engineers had actually reduced the **results** of these tests to **usable data** for the design of every V-belt Drive.

This intensively SPECIALIZED Research has naturally given Gates Engineers a most advanced knowledge of V-Belts and V-Belt Drive Design—and the benefit of this advanced knowledge and experience is available to **you, right in your own plant, any time you want it!**

Whether you have a difficult drive to design—whether some V-Belt drive in your plant is giving trouble—or whether you merely want to know what size and construction of V-Belts will give the most efficient and the lowest cost service on a particular drive—you have only to phone a Gates Engineer.

Actually, there are more than a dozen GATES V-BELT DRIVES on this One Combine!

Some of them you can't see, no matter what view of the Combine is given. Every one of these drives had to be of the most advanced engineering design to insure superior service.

Gates

Eng-509

The Mark of SPECIALIZED Research

There is always a Gates Field Engineer near you in all industrial centers. Just look in your phone book under "Gates Rubber." He will come to you promptly—and he will put at your service the full benefits of Gates unrivaled V-belt knowledge and experience **without the slightest obligation!**

THE GATES RUBBER COMPANY
The World's Largest Makers of V-Belts
DENVER, U.S.A.

GATES VULCO ROPE DRIVES
Engineering Offices and Jobber Stocks **IN ALL INDUSTRIAL CENTERS** at the U.S. and 71 Foreign Countries

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28 different analyses

TO EXACTLY MEET EVERY REFINERY PIPING PROBLEM

HERE at National Tube, we have developed 28 different analyses of still tubes, condenser and heat exchanger tubes, and refinery piping that will accommodate practically every condition of corrosion, oxidation, temperature, pressure and exposure. And our method of manufacture gives you a *seamless* tube. No welds. No joints—nothing to weaken the tube.

But remember: even with such a wide choice at your command, the selection of the proper alloy requires careful consideration. Otherwise you may end up with tubing that either does not give maximum performance or costs more than necessary.

That's why—to obtain optimum results at minimum cost—we suggest that you submit your problem to our engineers *before* you select new tubing or piping. Our huge file of successful refinery applications means that there's a good chance that we have encountered and *solved* problems just like yours before. And in case your application involves conditions that are entirely new, the wide experience of our experts will be of material assistance in finding the best solution possible.

Use this skilled background. For information, write to National Tube Company, Frick Building, Pittsburgh 19, Pennsylvania.

NATIONAL TUBE COMPANY, PITTSBURGH, PA.

(Tubing Specialties Division)

COLUMBIA STEEL COMPANY, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS · UNITED STATES STEEL EXPORT COMPANY, NEW YORK

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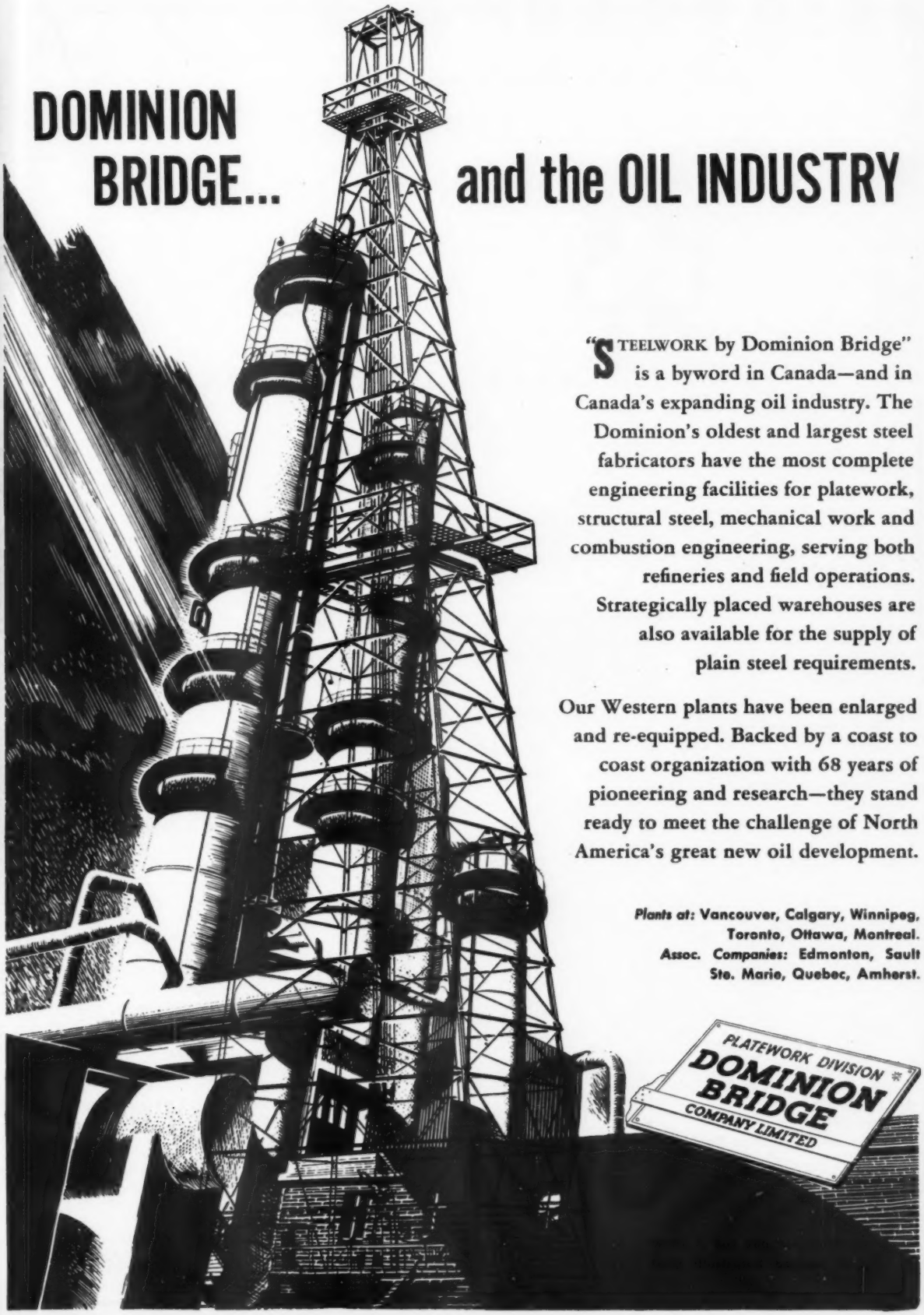
NATIONAL SEAMLESS PIPE AND TUBES

UNITED STATES STEEL



DOMINION BRIDGE... and the OIL INDUSTRY

"STEELWORK by Dominion Bridge" is a byword in Canada—and in Canada's expanding oil industry. The Dominion's oldest and largest steel fabricators have the most complete engineering facilities for platework, structural steel, mechanical work and combustion engineering, serving both refineries and field operations. Strategically placed warehouses are also available for the supply of plain steel requirements.

Our Western plants have been enlarged and re-equipped. Backed by a coast to coast organization with 68 years of pioneering and research—they stand ready to meet the challenge of North America's great new oil development.

Plants at: Vancouver, Calgary, Winnipeg, Toronto, Ottawa, Montreal.
Assoc. Companies: Edmonton, Sault Ste. Marie, Quebec, Amherst.

PLATEWORK DIVISION
DOMINION BRIDGE
COMPANY LIMITED

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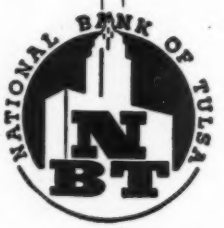

STATEMENT OF CONDITION

October 4, 1950

RESOURCES

Cash and Due from Banks	$41,561,751.30	
U. S. Government Securities	77,394,730.47	
Other Bonds and Warrants	7,208,753.26	$126,165,235.03
Loans and Discounts		39,403,059.48
Overdrafts		1,451.88
Income Receivable Accrued		362,386.84
Prepaid Expenses		99,767.00
Stock in Federal Reserve Bank		180,000.00
Bank Premises		2,000,000.00
Customers' Liability Under Acceptances		67,320.00
TOTAL		$168,279,220.23

LIABILITIES

Deposits		$155,707,228.91
Acceptances Executed		67,320.00
Income Collected, Not Earned		188,639.77
Reserve for Taxes, Interest, Etc.		901,218.64
Dividends Declared*		75,000.00
Capital—Common	$3,000,000.00	
Surplus	3,000,000.00	
Undivided Profits and Reserves	5,330,812.81	11,330,812.91
TOTAL		$168,279,220.23

*Payable $75,000.00 October 13, 1950

NATIONAL BANK OF TULSA

The Oil Bank of America

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

OFFERING COMPLETE BANKING AND TRUST SERVICES

NATIONAL BANK OF TULSA DIRECTORS

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DALE R. SNOW
Vice-President, Sunray Oil Corporation

FRANK M. SOWLE
Vice-President, National Bank of Tulsa

CHARLES A. STEELE
Attorney-at-Law

C. H. SWEET
Vice-President, National Bank of Tulsa

They Say—

Russian Oil Fields

"The principal fields in Russia before the war were located around the shores of the Caspian and Black seas. Other fields dot an area about 500 miles in width extending northward from the Caspian Sea some 2,000 miles into northern Russia. Because of the ravages and destruction of the war, the Caspian and Black Sea fields are reported to be largely exhausted and inoperative, so that about 50 per cent of Russian production now comes from the Ural area, about 800 miles southeast of Moscow.

"Within the Iron Curtain, Romania is the only other country having any sizable reserves, estimated to be about 400 million barrels. The total Russian potential is indeed small compared with the resources of the rest of the world, and it is no wonder that she eyes covetously the rich oil resources of the Middle East, which are a mere few days' travel overland from her southern borders. (Perhaps the most significant reason for the German invasion of Russia in World War II was to reach as quickly as possible the oil resources of the Middle East through Iran, to say nothing of Russian oil around the Caspian and Black seas.)

"It must be borne in mind, however, that since the estimates of Russian reserves are but informed guesses, the Soviet potential may be much larger because of postwar development."

Roger R. Sharp, writing on "America's Stake in World Petroleum," in Harvard Business Review for September.

We Call It Freedom

"Starting less than a century ago with only a hole in the ground, the oil men of this country have helped change the face of our civilization. They have given us the power for mobility and flight. Not only have they provided the lubricants for our vast industrial machine but today they are providing more than half of the total energy used in this country. They have helped make possible untold hundreds of good things—from lipsticks to wonder drugs. Moreover they have established comfortable reserves of oil which add to our national security. They have, in short, done much to transform the existence of yesterday to the good life of today.

"However, Oil Progress Week is designed not only to remind us of what the oil industry has produced,

STANDARDAIRE

Precision Built Axial Flow

BLOWERS handle the movement of air gently by screw action instead of paddle action, as is the case with other positive displacement blowers. Result—air pulsations and noise are reduced to a surprisingly low level. In Standardaire Blowers the revolutionary new form of the rotors marks a major improvement in blower design. The rotors are produced by an exclusive rotary generating process, the form and helix being controlled entirely by the machine gears. This produces rotor threads that are accurately shaped and machined to close tolerances for efficient blower operation. The design of the rotors and other construction details makes possible internal compression to a degree that Standardaire Blowers operate on a modified adiabatic cycle with a lower mean internal pressure. This important feature, together with advanced engineering throughout, makes for a quiet, compact, efficient blower with long service life.

Write for Standardaire Blower Bulletin covering dimensional information. Publication No. 88.

The Standard Stoker Company, Inc.,
Dept. C-24, 370 Lexington Ave.
New York 17, New York

Standardaire Blower equipped with unique pulley attachment for belt drive, when required.

THE STANDARD STOKER CO • INC •

Standard Stoker SSC

NEW YORK • CHICAGO • ERIE • MONTREAL

XUM

Specify

OCECO TANK FITTINGS

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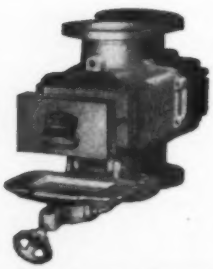

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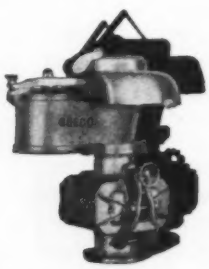

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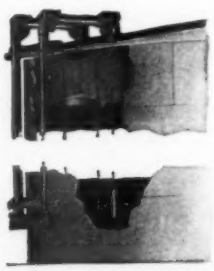

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C. T. Wright, president of Sunray Oil Corp., writing in the Sunray News.

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"As men used oil-driven machinery to produce vast quantities of better, less expensive goods, they took steps to abolish child labor, no longer a necessary evil. Because this new industrial economy required more trained personnel, leading citizens established a comprehensive educational system.

"Our high schools today are filled to capacity—and boys and girls alike are being prepared for a place in the nation's economic life. Today more than two and a half million young Americans are enrolled in nearly 2,000 colleges and universities.

"Scholarships set up by forward-looking men assist students on their way. Research laboratories endowed by industry help them apply their knowledge to the needs of this dynamic society.

"As the oil industry has played a prominent part in broadening youthful horizons, so it also provides a wide array of challenging jobs for those with zeal, courage, and initiative . . . In the North, South, East and Mr. Greely's West — enterprising young people are continuing to find a future in this business which employs nearly two million persons.

"Whether a youth's interest lies in atomic energy, petroleum engineering, or zymurgy, the American frontiers of tomorrow are wide open."

Oil Industry Information Committee in "Ahead With Oil."

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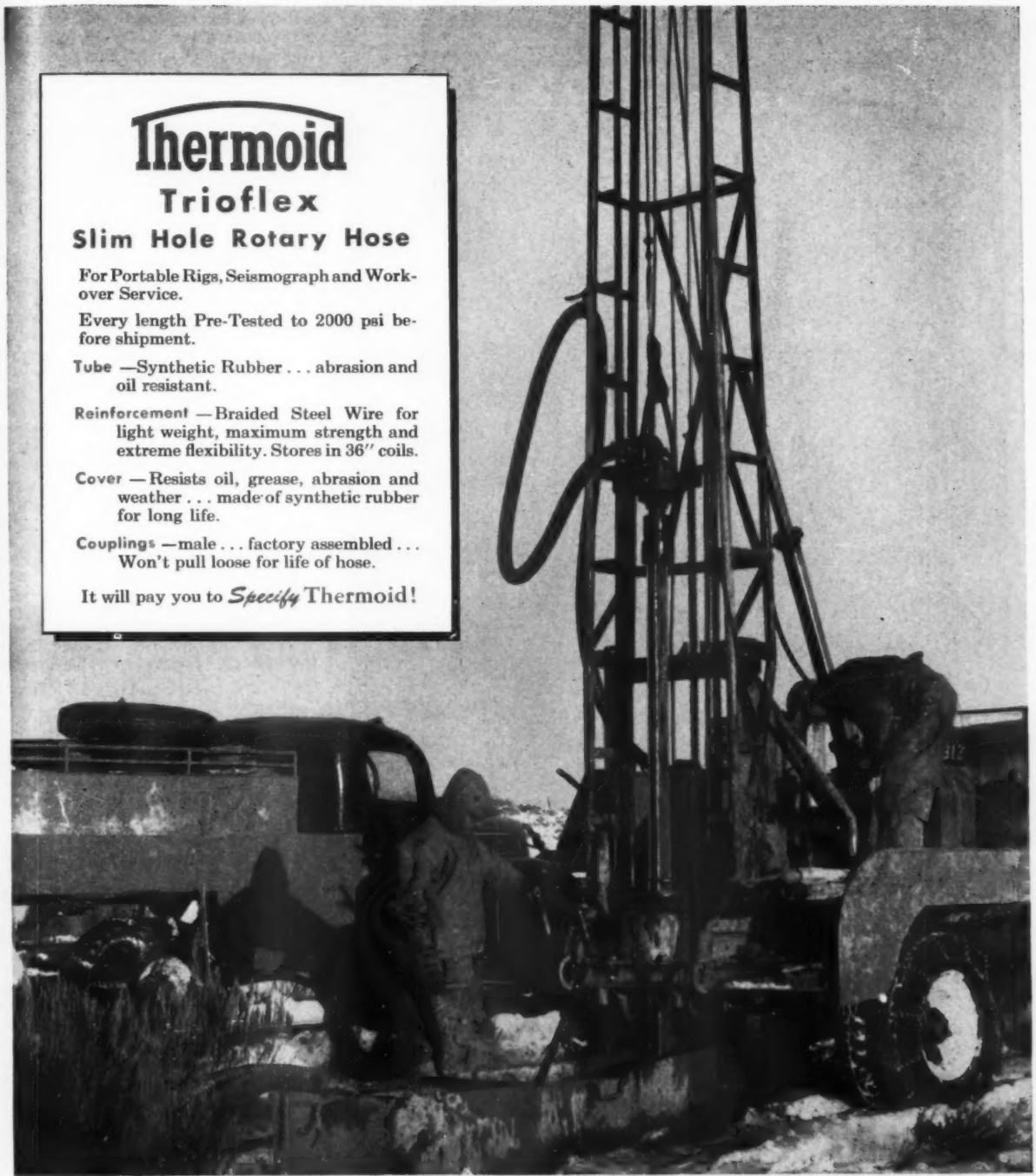

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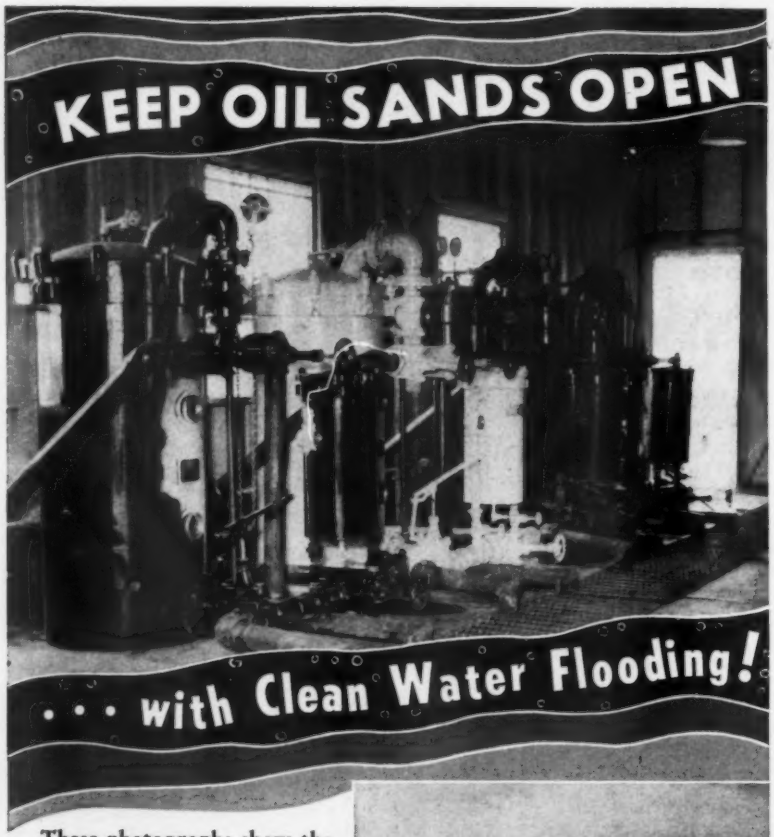
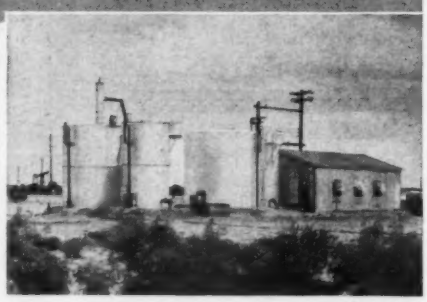


These photographs show the water treating plant of a prominent Texas producer.* In an 8-month period, according to their report, 1,600,000 barrels of Bowser filtered water were pumped down 2700 feet into tight sand, recovering 210,000 barrels of oil.



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"Baytown refinery, like many other large refineries across the nation, is increasing its crude runs, putting to good use equipment that was built and improved during the last few years. This increase is being made to meet expanded civilian demand and at the same time to make substantial contributions to the armed services for their current needs. At present, we are producing aviation gasoline at maximum capacity and are operating the butyl and butadiene plants at full capacity.

"No one can predict with precise accuracy what turn events may take. We should be able, in the months immediately ahead, to bear our usual share of the responsibility for meeting military and civilian demands. As for the long range view, the record of the industry and of Baytown refinery is reassuring. We will meet each challenge head-on, as it arises."

H. W. Ferguson, director in charge of refining and sales, Humble Oil & Refining Co., writing in "The Humble Bee."

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"There is no economic segment of our society that has been more conscious of its public responsibilities than the oil industry. There is no group that has done more to implement this consciousness by concrete action. None has taken a more enlightened and forward-looking view of its place in the pattern of our national life, especially in these days of rapidly changing conditions.

"The oil industry has met every test in the 91 years of its existence. It is prepared today to meet the new and awesome challenge of this hour and of tomorrow. It is ready to accept any sacrifices or dislocations that may be necessary in putting forth its all-out effort to fulfill its important obligation in whatever war effort may be necessary, but we shall insist that our industry shall maintain its fundamental freedom.

"When this emergency is over we want to feel confident that in mobilizing under government supervision and direction for whatever this crisis may make necessary we will continue as a self-reliant industry wholly free from any temporary or permanent federal control. This assurance we had during World War II when the industry was mobilized under government supervision. That promise was kept. We ask no less than that in the crisis of today and tomorrow."

Walter S. Hallanan, chairman, before National Petroleum Council.

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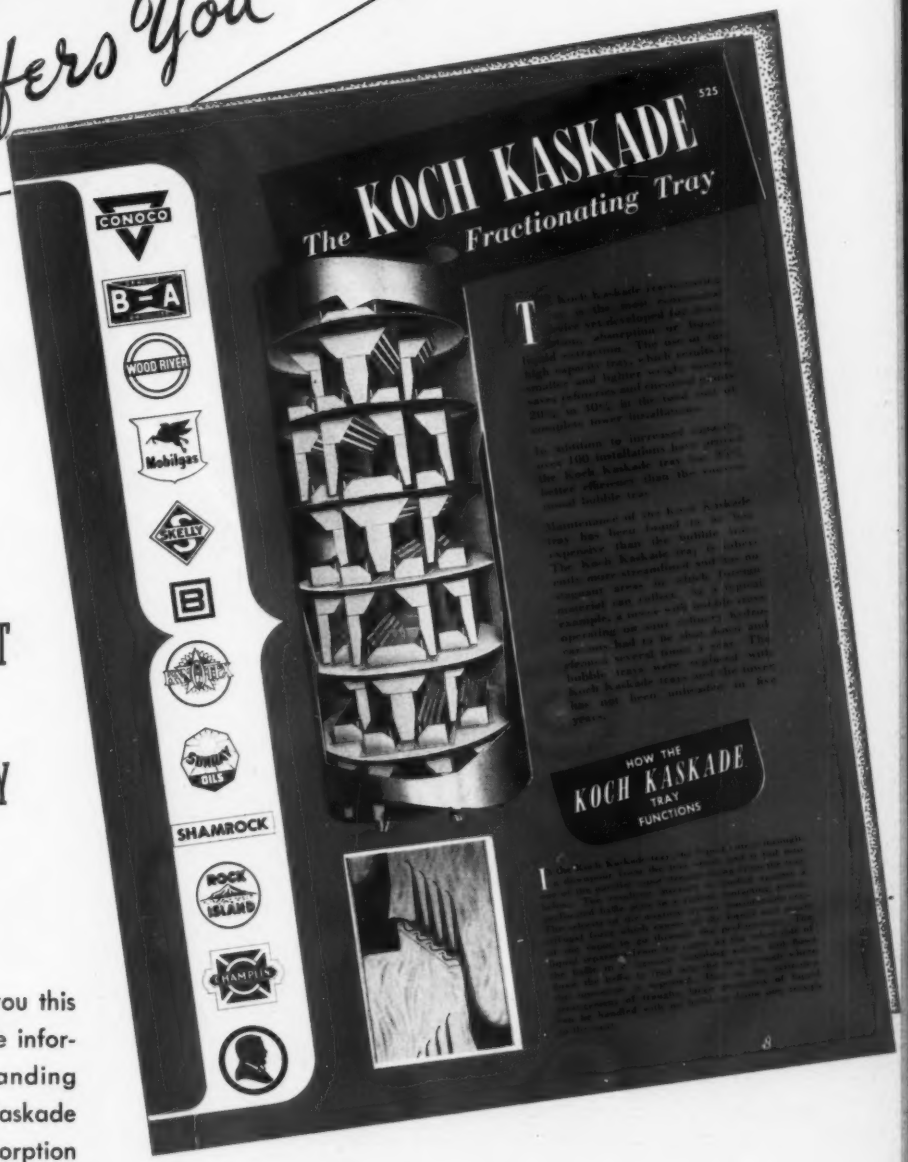

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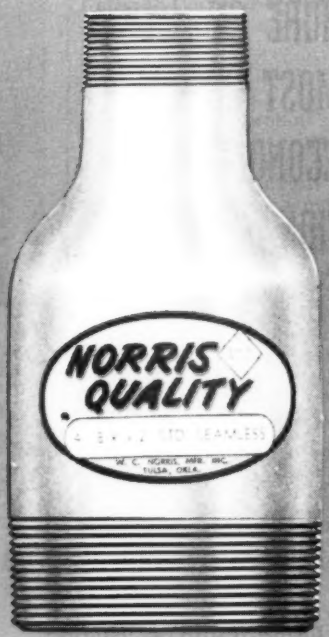

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JOURNALLY Speaking

On Women

WE always were a sucker for the fair sex, so we can't resist putting in an occasional plug for the feminine side of the oil industry. These oil gals are getting so active, and are becoming so interested in learning about petroleum operations, that new organizations keep popping up all over the country.

The latest to come to our attention is a brand-new Desk and Derrick Club in Houston, patterned after the "mother chapter" which has been such a whopping success in New Orleans. These Houston belles have mapped out an ambitious program of field trips, lectures, and study courses in a determination to learn all about their bosses' business.

Similar groups, we have been informed, are going strong in a number of other oil cities, and our spies report that a movement is afoot to form an organization in Tulsa. Not all the groups have the same name, and some of the newer ones are still undecided about a title, but there is something about "Desk and Derrick" that sounds catchy and appropriate to us. Besides, general adoption of the same name suggests the possibility of a federation or a national organization of women in the oil business, with exchange of ideas and programs.

Wherever these clubs have been successful it has been because of programs by which the girls can get a better understanding of their work and of the terms and operations in the industry. If this movement keeps up, the men in the industry may have to hump themselves to stay ahead of their young lady assistants, but what's wrong with that?

Talk about Talk

WHOEVER said talk is cheap didn't know about oil conventions. Oil men spend plenty to go to conventions to hear a dozen or so talks, mostly by other oil men. If some statistician could add up the money spent by the thousands of people attending oil meetings every year, plus the cost of preparing the papers which are delivered and then divide this sum by the number of words in the scheduled speeches, he would find that these oil talks run to a pretty high per-word figure.

But the oil men seem to think that it is worth it, for they are going to these meetings and listening to these talks in greater numbers than ever before. This time of year, particularly. Right now the important oil meetings are coming so fast they almost overlap, and folks who like to take them all in hardly get home long enough to change shirts. But they don't complain, and neither do we. It's the kind of talk that takes place at these meetings that give us pen pushers something to write about.

Matter of Nomenclature

UNUSUAL rains in Australia have actually put some water into Lake Eyre, according to the National Geographic Society, which adds that it is normally bone dry the year around although always shown on maps as a big lake out of deference to scientists who say it "has all the characteristics of a lake except water." Wonder what kind of scientists those are? In our industry we have holes that have all the characteristics of an oil well except oil, but people who call them oil wells don't keep their scientific standing very long.

Blood Money

OUR Circulation Manager is very hard-boiled. Either he gets his cash on the barrelhead or you don't get your subscription to our favorite oil publication. He only wishes all subscribers were as prompt as one who answered a renewal notice with the following telegram: "Take a quart of blood or pound of fat, but don't stop the Journal's regular trip here. Check on way."

—Henry D. Ralph

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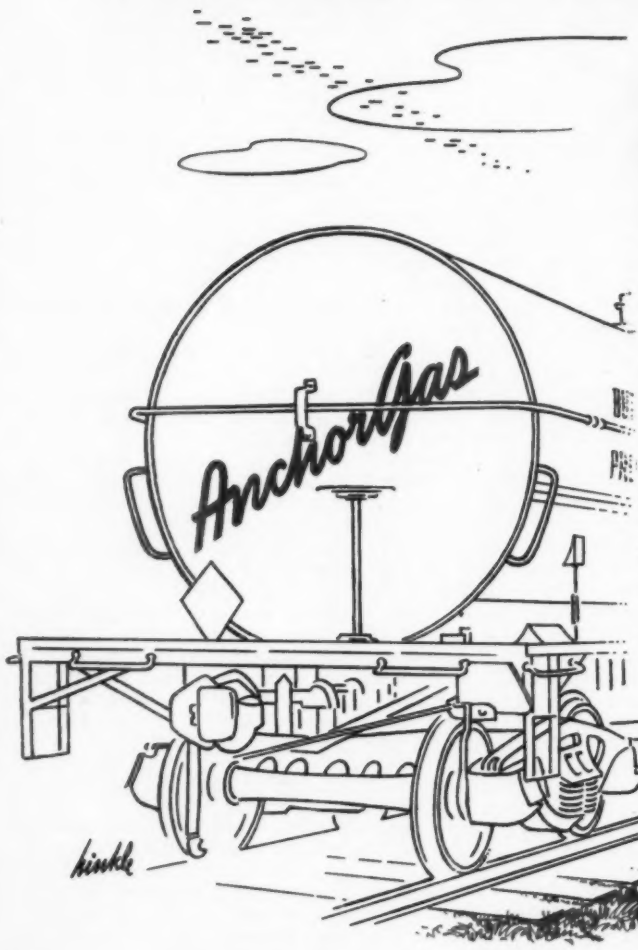

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Under the Bed

Our desk is piled high with speeches made by leaders of the oil industry during Oil Progress Week. With remarkable unanimity these speeches embody a common theme. They recite the accomplishments of the industry under free enterprise and then express fear that the Government is about to impose hamstringing controls or even partial socialization.

Why this fear? Are these men seeing things under the bed? Are they crying "wolf" just to attract attention? Are they slavishly echoing a slogan trumped up as a rallying cry?

No, they are not. These men think for themselves, and their expressions are sincere, based on careful observation and considered opinion. They cite numerous things going on in Washington and throughout the country as specific evidence for their fears that the petroleum industry is in peril.

The specter of government control is not a straw man set up as a target for verbal brickbats. It exists. It is not one man, one platform, one bill. It is a lot of creeping, crawling things lurking in the woodwork, dashing out to bite at every opportunity.

It is an attitude, a belief that success must be suspect, that whatever has been done must have been done wrong, that somebody else could do things better. This attitude is prevalent in government because it is widespread in the public either through ignorance or apathy.

This attitude materializes in such tangible forms as attacks on the oil industry's tax structure, in utility regulation of the gas business, in legislative and court actions to break the industry into segments, in bureaucratic efforts at reform, in repeated investigations, and in countless other real threats. One at a time, perhaps, these threats could be beaten off, but as they come from many directions at once the industry is in constant danger of losing ground some place.

No single one of these threats, perhaps, would spell the doom of the oil industry, but if two or three of them succeed the industry would never again be the same. And each attack on the industry seems to breed a swarm of others like it to harass in other quarters.

Constant vigilance is the price of liberty, and the industry had well be on guard day and night. Speeches by industry leaders are just a start. The fears and reasoning they voice should be repeated by all men in the industry, not to each other, but to voters, office holders, school children, and the entire public until it is no longer popular to sneer at free enterprise.

The peril to the petroleum industry will not lessen until a strong majority of the entire nation turns against the attitude of suspicion of free enterprise and desire for reform and regulation. The petroleum industry should be well aware that it really is in danger. There are things under the bed, and in the bed and all around, and the industry can expect no peace as long as the political atmosphere is favorable to their breeding.

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THIS WEEK

STEEL—Lack of workable plan for allocating steel puts squeeze on oil industry in obtaining containers, tank cars, line pipe, tubular goods. . . . ¶NPA in Washington seeking way to produce 12,000 to 16,000 new tank cars by June 1952. . . . ¶T.I.P.R.O. asks increased steel allocations for tubular goods to offset black market. . . . Suggests purchase-control plan. . . .

SUPPLY—No shortage of heating oil in New England this winter foreseen by Senate committee if suppliers build up terminal stocks rapidly. . . . ¶Heads of major companies tell Texas Railroad Commission stocks of crude and products are now about at desirable levels. . . . Forecast some increase in imports. . . . Say additional Texas production not needed. . . . ¶Octane rating of motor gasoline continued to climb in third quarter, reflecting no diversion to aviation gasoline. . . .

INDUSTRY—Regulation of natural-gas business as a common-carrier utility attacked at meeting of I.N.G.A.A. . . . ¶Existence of oil jobbers threatened by FTC attack on price differential for various classes of dealers. . . . ¶Service Pipe Line Co. opens world's first building designed specifically for pipe-line operation. . . .

Hot Spot— Pointe a la Hache field in Plaquemines Parish continues to be an important drilling and producing area in southern Louisiana. This view shows one of three heavy-duty rigs operated by Richardson & Bass for joint account with Humble Oil & Refining Co. working at 3-E Morgan City Land & Fur Co. State 13-19. In the background are christmas trees of wells completed in the dredged channel.

WEST COAST—Leading purchasers raise price of heavy-type crudes as much as 10 and 25 cents per barrel, citing increased demands and need to step up production of heavy crude. . . . ¶Many areas in the Pacific states still hold potentialities inviting exploration for oil and gas, A.A.P.G. told at Los Angeles meeting. . . .

TRENDS—Total well completions in the third quarter averaged 124 wells a day. . . . If operators average 120 completions a day in the fourth quarter, the total for the year will reach the 43,084 wells forecast at midyear. . . . ¶Cumulative totals will probably exceed last year's 12-month total by the end of November. . . .

ACTIVITY—Crude production for week ended October 21 averaged 5,821,525 bbl. daily, up 33,360 bbl. daily from previous week. . . . Total well completions gained 40 wells for the week to 934. . . . ¶Wildcat completions totaled 182 for the week compared with 168 the previous week and 131 in the same week last year. . . . ¶Rotary rigs operating in United States reached 2,347 on October 16, up 67 rigs from previous week and 369 rigs from same week in 1949. . . .

INTERNATIONAL—Puerto La Cruz refinery officially dedicated by Sinclair and Venezuelan officials. . . . Plant has capacity of 35,000 bbl. daily, processing Santa Barbara-type crudes. . . . ¶Caltex affiliate successfully overcoming difficulties in development program in jungles of Sumatra. . . . ¶Refinery-rehabilitation program in Japan results in imports being halved. . . . Minimum needs now being met with exception of gas oil and lubricating oil. . . . ¶New lubricating-oil manufacturing plant to be built at Curacao, West Indies, by Royal Dutch-Shell subsidiary. . . . ¶Supply of oil to Red China after Korean war started remains a mystery. . . . Senate committee charges at least 11,500 bbl. of lube oil was permitted to leave Japan for Chinese ports after Korean invasion. . . .

REFINING—Taylor Refining Co. will modernize its 22,500-bbl. Corpus Christi refinery with addition of 8,000-bbl. modified T.C.C. unit. . . . ¶Development of new catalyst and adsorption adaptation of silica gel cited as two contributions to current search for increasing output of petroleum benzine. . . . ¶Sinclair Refining reports two solvent refining units have rounded out long periods of continuous operation without turnarounds. . . . ¶Onyx Refining Co. to install Platforming unit, other facilities at its Abilene, Tex., plant. . . .

PIPE LINES—Latex Construction Co. completes work on 99 miles of 30-in. gas line for Tennessee Gas Transmission in Louisiana and Arkansas. . . . ¶Humble let contract for laying of 50-mile gas line from Trawick field to near Longview, Tex. . . . ¶El Paso Natural plans new office building as part of expansion program. . . . ¶Bell Oil & Gas acquires gathering system of Magnolia Pipe Line in Milroy field of Stephens County, Oklahoma.

Steel Allocations

Because no workable system has yet been devised, the oil industry has no way to obtain containers and tank cars

Bertram F. Linz

WASHINGTON. — Further curtailments in civilian consumption of strategic materials were in sight this week as the accelerating defense program developed possibilities of new supply problems.

For the oil industry the latest problem is that of obtaining containers, and there was no solution until this week when defense order priority ratings were extended by the National Production Authority this week to cover containers and chemicals needed by the oil industry to fill military contracts. The order emphasized, however, DO rating may be used only to secure the minimum quantities of containers or chemicals required to fill a defense order.

Explaining how the priority extension would work, the NPA cited an order by the Air Force for 100 cans of lubricating oil, not in itself a rated order, placed with a refiner who requires two types of chemicals to be used in filling the order, one to be used directly in the production of the oil and another which will be consumed or converted into byproducts while the oil is being processed. The DO rating, the agency said, could be assigned to the refiner for both chemicals.

As another example, NPA said the Navy, placing an order with a refiner for 500 drums of gasoline, also not a rated order, may assign to the refiner the right to apply a rating to get the drums.

The situation with respect to other oil-industry material needs is the same as it was in containers, with no organization yet ready to channel them to where they are needed. This applies also to a request from the transporation authority in the Interstate Commerce Commission for steel for construction of railroad freight cars, including normal and high-pressure tank cars.

Also tied up is an application for steel for the proposed Texas-West Coast oil pipe line which has been submitted to PAD.

Mills swamped. — The situation has served to intensify the belief of the steel industry that the present priorities system will have to be drastically modified in a matter of weeks. Mills are reporting that orders already on their books exceed the maximum percentages which the NPA said this month will have to be furnished on DO orders, and industry leaders predict those percentages will be raised substantially in the near future.

Rubber. — The NPA ordered further cuts in the consumption of natural rubber last week, limiting the use of new rubber—natural and synthetic—to less than 90,000 tons a month as contrasted to an actual consumption in September of approximately 109,000 tons, and established procedures for formal allocation of synthetic rubber produced in government plants. The agency aims eventually to force the tire industry to a ratio of 65 per cent synthetic and 35 per cent natural rubber. The natural rubber conserved by the NPA program will go into the government stockpile.

Exports.—Restrictions on exports also are being tightened. The Office of International Trade has ordered that validated licenses must be secured for all exports of oil and gas-well drilling equipment, tools, and parts, regardless of the value of the shipment. Heretofore, such materials required no license for shipments not exceeding $100 in value.

Budget cuts. — The Interior Department has worked out the cuts in operation which will be made necessary by the Budget Bureau order not to spend $73,012,000 of the funds approriated by Congress for the current fiscal year. Nearly $57,000,000 of this total was specified by the bureau to be applied to reclamation activities, and only a relatively small part of the remainder will be imposed on projects involving oil. The Geological Survey is to reserve $500,000, of which $300,000 will come from funds for topographic mapping and $25,000 from geologic mapping and mineral-resource appraisals. The Bureau of Mines is cut back $360,000, of which $120.000 will be applied against the production of excess power at the synthetic-liquid-fuels plant at Louisiana, Mo. The Bureau of Land Management will lose $250,000, of which $25,000 will come out of land classification work and $50,000 out of cadastral surveys.

Policy.—A "watchdog" committee will shortly be setup by the National Security Resources Board, in conformity with a presidential order, to advise the board on national mobilization policy. The committee, to be appointed by NSRB Chairman W. Stuart Symington, is to include representatives of business, labor, agriculture, and the general public.

Gas problems.—Interior Secretary Oscar L. Chapman set up a defense power unit last week and had before him a petition from the gas industry for divorce of gas from the PAD.

Representatives of the industry have had several conferences with Interior officials and following a meeting of a large delegation with Assistant Secretary C. Girard Davidson presented a brief setting forth the reasons why a separate gas administration for defense should be established.

The major argument of the industry is that gas now has achieved the status of a major fuel, as important as oil or coal, and should not be subjected to the domination of an agency primarily concerned with petroleum.

Oil Tank Cars

Plans studied to build more as shortage looms

WASHINGTON.—Action on a program to provide 227,400 new freight cars by June 30, 1952, including 12,000 to 16,000 tank cars, is expected to be taken in the next few days by the National Production Authority to meet a shortage already serious which will be intensified as defense requirements increase.

The request for steel for the construction of freight cars at a rate of at least 10,000 a month was submitted to NPA by the Defense Transport Administration. This figure, however, the agency said, is the absolute minimum that will enable the railroads to meet the anticipated 1952 defense-transportation requirements.

More for L.P.G.—The DTA program include 600 to 800 tank cars a month, pretty evenly divided between high-pressure and general-purpose cars, and it has been represented that, given the steel, car builders could begin almost immediately to turn out 250 to 300 a month, gradually stepping the production up. Orders now in the hands of the car builders call for some 6,000 tank cars, about half of them of the high-pressure type. The high-pressure cars would be used largely for L.P.G. movement and most of the general-purpose cars also would go to the oil industry.

A survey of the car situation, submitted to NPA in support of the program, showed there were 142,964 tank cars, not owned by Class I railroads, at the close of 1949, and 8,895 owned by all railways, a total of 151,859.

Several surveys.—The tank-car situation, however, already is difficult because of the heavy seasonal movement of L.P.G. products, and is expected to become even tighter as the

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PAD program for the transfer of avgas components gets into high gear.

The survey showed that the car-building industry is in a position to turn out cars at a rate even faster than contemplated in the present proposal, having produced an average of more than 11,000 cars a month in February, March, and April of 1949.

A study also is being made of the feasibility of reinstituting the wartime order to eliminate or reduce cross-hauling, which permitted common use of tank cars and storage facilities, through purchases, sales, exchanges, and loans, with respect to some 56 commodities. The wartime order, of course, was mandatory, but consideration is now being given to a voluntary agreement for which antitrust clearance would be obtained by the NPA.

The PAD is making its own investigation of the tank-car situation and estimating future car requirements, and will lay its findings before the NPA when the construction program comes up for interdepartmental consideration. A study of all petroleum-transportation requirements is also being made by a National Petroleum Council committee at the request of the Interior Department and a report may be submitted at the council meeting next month.

One-Price System

FTC may order jobbers to pay retail prices

WASHINGTON.—The Federal Trade Commission has under consideration a pricing order that might have as far-reaching an effect upon the oil and other industries as did the Supreme Court decision outlawing basing-point pricing in the Cement Institute case in 1948, the first step in the commission's attack upon traditional price policies.

The proposed order would prohibit Champion Spark Plug Co. from selling "to any purchaser at a price different from the price charged any other customer who either (a) purchases Champion spark plugs for original installation in engines, motors, or engine or motor-propelled vehicles manufactured for sale and sold in competition with engines, motors, or engine or motor-propelled vehicles of other manufacturers, or (b) who purchase Champion spark plugs for resale in competition with others engaged in the sale and distribution of Champion spark plugs." The only discounts permitted from such prices would be those justified by savings in production or distribution costs by reason of large-sized orders.

The order is being contested by the company, which contends it will break down the present functional classification of industry—manufacturers, wholesalers, retailers, and consumers—under which manufacturers receive a lower price than wholesalers, wholesalers a lower price than retailers, and retailers a lower price than consumers.

Oil affected.—A report on the scale of the "original equipment" market and the prevalence of differentials between original equipment and trade customers prepared by Dun & Bradstreet, Inc., shows that petroleum products, tires, and batteries are among the thousands of items sold to both classes and that 70 per cent of the companies responding to inquiry sell at different prices for manufacturers and trade customers.

According to a brief filed with the commission by Champion, its order would outlaw the practice of governmental agencies of buying on competitive bids and make necessary the quotation to such buyers of the same prices for which a product was offered any other customer.

Eliminate jobbers.—Further, the company charged, it would end a discount system under which independent manufacturers, wholesalers, and retailers have been able to operate in the past, and eliminate jobbers, wholesalers, and other middlemen.

"This ill-conceived and irresponsible attack upon the American functional price structure is contrary to all authority," the company asserted. "Again and again under the old Clayton Act and under the new Robinson-Patman Act, the courts and the commission have said that variations in prices between functional classes may be price 'differences' but are not, within the meaning of these acts, unlawful price 'discriminations.' The proposed order asserts that all prior courts and commissions were wrong."

Broad action.—That the commission will extend its campaign to other industries if its order on spark plugs is upheld was indicated by commission officials during argument in the Champion case. And that there would be a broad field for commission action was disclosed in the Dun & Bradstreet report that "virtually all American industry buys or sells raw materials, supplies, or components to be incorporated in end products."

In its brief, Champion pointed out that the proposed order will have to be considered if the lower court decision in the Standard Oil Co. (Ind.) case is reversed by the Supreme Court, which is expected to hand down its opinion next month.

Ironically enough, if the commission's philosophy as embodied in this

Rube Goldberg Views the News for His Latest Invention

HOW TO CLOSE PACKED SUITCASE

NOTRE DAME FOOTBALL PLAYER (**A**) CRIES OVER FIRST DEFEAT IN 40 GAMES-- TEARS (**B**) CAUSE CACTUS PLANT (**C**) TO GROW, DISTURBING **GUSSIE MORAN**, READING **HEMINGWAY'S** NEW BOOK (**D**)-- SHE LEANS BACK, CAUSING **O'DWYER** (**E**) TO SLIDE INTO NEW YORK (**F**) AND APOLOGIZE FOR WITCH-HUNT REMARK-- WITCH (**G**) FLIES IN TO ACCEPT APOLOGY, UNCOVERING **NANCY SINATRA'S** BIG SETTLEMENT (**H**)-- HEADWAITER (**I**) SEEING DOUGH, PUTS HAND OUT FOR TIP, CAUSING **SENATOR KEFAUVER'S** FINGER (**J**) TO ACCUSE RACKETEER (**K**) WHO RUNS INTO HANDLE (**L**), STARTING **OLSEN AND JOHNSON'S** NEW SHOW (**M**)-- BULLET HITS BAG (**N**) AND PEANUT (**O**) FALLS IN FRONT OF ELEPHANT (**P**) WHO STEPS ON SUITCASE TO REACH IT AND CLOSES SUITCASE NICE AND FLAT.

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WATCHING WASHINGTON

Bertram F. Linz

Quota Questions

With little more than 2 months before the Mexican reciprocal trade agreement is scrapped and the quota provisions of the Venezuela agreement again apply to oil imports, the Government is encountering difficulty in determining how the quota shall be applied.

Because of the development of Middle East sources and the consequent shifts which have occurred in the import picture since the war, officials were considering merely announcing how much oil would constitute 5 per cent of our 1950 refinery throughput and therefore be eligible for import at the cut excise tax of 10½ cents a barrel, and let the supplying countries scramble to get their shipments in under the wire.

It is reported, however, that the Venezuelan government has raised objections to this method and is pressing for adoption of specific country allotments such as were made during the few years the quota was in effect and under which that country was given some 70 per cent of the total.

When quotas were in effect during the period 1940-42, inclusive, the only countries from which substantial quantities of oil were imported were Venezuela, Netherlands West Indies, Colombia, and Mexico. Now the principal sources of imports also include Trinidad, Iran, Iraq, Saudi Arabia, and Kuwait.

Under a country-allocation system, Venezuela believes it would still get a major share of the total quota, even though additional countries have come into the picture, since the allocations would be figured on a historical basis which would minimize the importance of the Middle East countries.

Silence Requested

The Army has issued a new warning to oil companies, manufacturers, chambers of commerce, and other organizations to be careful in answering requests for information, particularly from abroad, that might be of value to an enemy.

Some months ago a similar caution was issued following reports that requests for information about our resources, industries, utilities, and other facilities, were pouring in from suspect sources in Europe.

Oil companies, officials say, are most likely to receive requests for road maps, information regarding refinery location and operation, data on oil fields, and similar subjects. Many of these come from sources in Europe which investigation has disclosed are not as innocent as they appear, and the Army says that efforts by unfriendly interests to build up files of strategic intelligence on the United States are of continuing concern to the armed forces.

The Army suggests that when an oil company receives requests for information that could be used for purposes inimical to our security, they should be referred to the nearest military headquarters or to the Department of Commerce office of international trade in Washington which has taken over the job of processing, reviewing, and replying to such requests.

That Phillips Case

Hearings in the Federal Power Commission's investigation into the natural-gas operations of the Phillips Petroleum Co., now scheduled to open in January, are going to develop some knotty questions which undoubtedly only the courts will be able to answer if the commission finally holds the company subject to its jurisdiction.

According to George T. Liddell, a former FPC examiner who presided at hearings in 1946 when the question of jurisdiction was originally raised, the commission's order for the investigation is without legal precedent and the issue is so general that it is difficult to pin it down so that both sides will have difficulty in deciding where to start putting in testimony and what they are going to prove.

The order for the investigation was issued by the commission just 2 years ago—October 28, 1948—but hearings were postponed while Congress wrestled with the Kerr bill, which would specifically have prohibited the FPC from asserting any authority over independent producers and gatherers of natural gas.

The issue, however, had been raised 2 years earlier by counsel for the city of Detroit during hearings on the Michigan - Wisconsin application, to which they asked that Phillips be made a party and the matter of jurisdiction be determined then and there.

By its action in the Phillips case the commission is expected to show the attitude it will take with respect to natural - gas producers generally.

order were carried to the ultimate it might react most directly upon the group whose urging was principally responsible for enactment of the Robinson - Patman Act — the wholesale grocers—the company said.

No Shortage

Committee says heating oil for New England ample

WASHINGTON. — A Senate small-business subcommittee reported this week that barring a deterioration of the international situation or lower-than-normal temperatures, there need be no shortage of heating oils in New England this winter provided immediate steps are taken by supplying refiners to build up terminal stocks in the area.

To accomplish this, Sen. William Benton of Connecticut, chairman of the subcommittee, called on the refiners to increase their yields of heating oils over the next several weeks, a step which he said already has been taken by some of the major companies.

Stocks low.—A staff investigation of the New England situation showed that as of October 14 primary stocks of distillate fuel oils in the East and Gulf Coast areas were 5,600,000 bbl. under those of a year ago, although kerosine stocks were 536,000 bbl. greater. However, the staff report commented, the lower level of distillate stocks in the hands of suppliers was partly counterbalanced by greater volumes held by dealers and in consumers' tanks.

The report found that heating-oil demands may be 14 to 20 per cent greater than last year, with a normal winter but, Benton said, "New England cannot count upon as mild a winter as occurred in the past two seasons."

There appears to be no reason for undue concern over the prospects, the subcommittee reported, but warned that neither is there any justification for complacency.

Benton's subcommittee, composed of Senators Herbert R. O'Conor of Maryland, Russell B. Long of Louisiana, Charles W. Tobey of New Hampshire and Leverett Saltonstall of Massachusetts, was set up last month under a Senate resolution authorizing an investigation of the whole New England fuel situation.

Companies alert. — The preliminary inquiry showed that the oil companies are alert to the situation and are making plans to meet the indicated requirements of the area. The current tight supply of tankers is creating some difficulty, but this situation is expected to ease off by the end of the year, the report said.

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Imports and Stocks

Both should continue at about present levels, executives of major oil companies advise Texas Railroad Commission

Leigh S. McCaslin, Jr.

AUSTIN.—Testimony by high officials of 15 major oil companies that present crude stocks in the United States are adequate preceded a minor cut by the Railroad Commission in Texas November oil production.

All the executives agreed that additional Texas crude production is unneeded at the present time. However, a fairly wide range of figures was presented as to adequate stock levels of crude and products. In general, the companies presented stock figures that were slightly lower than those given the commission at a similar hearing last May. The figures were substantially lower than estimates presented in April of 1949. (See Table 1 for crude and gasoline figures.)

Officials present included: Eugene Holman, president, Standard Oil Co. (N.J.); W. S. S. Rodgers, chairman of the board, The Texas Co.; Dr. Robert E. Wilson, president, Standard Oil Co. (Ind.); Henderson Supplee, Jr., executive vice president, Atlantic Refining Co.; R. G. Follis, chairman of the board, Standard Oil Co. of California; B. B. Jennings, president, Socony-Vacuum Oil Co., Inc.; R. G. Dunlop, president, Sun Oil Co.; P. C. Spencer, president, Sinclair Oil Corp.; J. L. Latimer, president, Magnolia Petroleum Co.; J. J. Cosgrove, chairman of the board, Continental Oil Co.; Hines Baker, president, Humble Oil & Refining Co.; K. S. Adams, president, Phillips Petroleum Co.; Dean Hodges, Shell Oil Co.; B. S. Watson, vice president, Cities Service Co.; S. A. Swensrud, president, Gulf Oil Corp.

Excellent balance. — Dr. Robert E. Wilson, president of Standard Oil Co. (Ind.), told the commission "I never saw crude and stocks in such excellent balance." Stressing the importance of stock figures, S. A. Swensrud, president of Gulf Oil Corp., said, "It seems to me that under conditions where stocks of both crude oil and products appear to be in sound position, actual changes in crude-oil stocks—as quickly as they can be observed—can be considered as the best indication of whether allowables need to be decreased or increased."

In contrast to the general sentiment, Eugene Holman, president of Standard Oil Co. (N.J.), and Robert G. Dunlop, president of Sun Oil Co., advocated higher stock levels. Holman suggested crude stocks in the range of 245 to 260 million barrels, and based this higher figure on the increased consumption of late. Dunlop said that stocks should be figured on the basis of days' supply, and that 41 days is an ample figure. On this basis, the Sun president believes stocks should be at about 250 million barrels. This figure was also concurred in by Atlantic Refining Co. and Standard Oil Co. of California.

In addition to crude stocks, testimony before the commission covered heating-oil stocks, imports of foreign crude, lower bottom-hole pressures in East Texas field, and a recommendation that allowables be cut drastically for certain West Texas fields.

Some concern was expressed as to the adequacy of present heating-oil stocks. Holman described October 1 stocks of 76,700,000 bbl. of heating oil as "low." However, he and others said that this deficiency can be overcome readily by adjusting refinery runs.

"I can't prove it, but I think there is more heating oil nearer the consumer than ever before," said W. S. S. Rodgers, chairman of the board of The Texas Co. "I think the same thing applies to gasoline."

Higher imports. — As to imports of foreign crude, testimony by the executives indicates that slightly increased rates can be expected during the first half of 1951 (see Table 2). Products imports, which consist primarily of residual oils, will average 200,000 to 220,000 bbl. daily in January, February, and March, and will drop to 170,000 or 190,000 bbl. daily the next 3 months, according to testimony.

East Texas.—There was considerable difference of opinion at the hearing over a proper allowable for East Texas field. Bottom-hole pressure has dropped 17.64 psi. during the past 6 months, and a number of operators requested fewer producing days because of this decline. However, the commission set the November allowable at roughly the same as for October. The field was given 20 producing days, which is 1 less than October, but November is a 30-day month while October has 31 days.

West Texas.—Before setting the statewide allowable, the commission heard a recommendation by its chief engineer, Jack Baumel, that the calendar-day rate for Kelly-Snyder, Diamond M, and Sharon Ridge fields be cut to 65 bbl. daily. This calendar rate would give these Canyon reef fields of West Texas a maximum efficient production rate of 100 bbl. This contrasts with the current 160-bbl. rate and the 220-bbl. figure of mid-September.

Operators objected strenuously to Baumel's recommendation and said that the problem of lowering bottom-hole pressures is being handled adequately. They said that extensive studies are being made into both gas and water-injection programs. These plans will be announced at the special hearing which has been caled by the commission for November 7 to study the reef fields, it was reported.

After the hearing was concluded the commission upheld the reef-field

TABLE 2—CRUDE IMPORTS DURING THE PAST 4 MONTHS AND ESTIMATES FOR FIRST HALF OF 1951
(Barrels per day)

Company—	4 Months	1951
California Standard	37,000	47,000
Atlantic	48,714	59,600
Gulf	105,576	108,000 to 115,000
The Texas Co.	66,462	65,000
Jersey Standard	74,500	85,000 to 100,000
Sun Oil	8,962	7,500
Socony-Vacuum	64,548	80,000
Indiana Standard	18,215	16,340
Sinclair	47,800	57,400
Phillips	2,130	6,500
Shell	7,900	3,500
Cities Service	6,926	3,751

TABLE 1—DESIRABLE U. S. STOCK LEVELS OF CRUDE AND GASOLINE AS PRESENTED TO THE TEXAS RAILROAD COMMISSION BY EXECUTIVES OF 14 MAJOR OIL COMPANIES
(Figures in millions of barrels)

	Crude			Gasoline		
	April 1949	April 1950	Sept. 1950	April 1949	April 1950	Sept. 1950
The Texas Co.	225-275	235	235	120	125	100
Gulf Oil Corp.	265	240	240	125	130	100
Sun Oil Co.	240-268	250	250	128	145	105
Humble O. & R. Co.	248-268	246-260	240-250	122-127	138-142	100-106
Socony-Vacuum	250-268	240	240	120	137	95.5
Atlantic Ref. Co.	240	250	250	120-125	138	101
Standard Indiana	250-260	245-255	240-250	123	135-137	105
Shell Oil Co.	250-275	245	245	128	135	104
Cities Service	250-260	240-250	240-250	123-126	138-142	100-104
Sinclair	268	245-260	245-260	127	140-145	105
Continental	255-285	238-245	238-245	130	120-125	90-95
Phillips	245 max.	240	240	.....	135	100
Standard Calif.	.....	250	250	.....	130	105
Standard N. J.	.....	245-260	245-260	.....	135-140	100-105

operators' objections by not cutting the field allowables. The state as a whole was granted 21 producing days for November and East Texas field was given 20 days. This is one less producing day than currently, but will cut production only 26,808 bbl. daily because of the shorter month.

Allowables. — The November allowable gives a state-wide total of 2,722,705 bbl. daily. This compares with purchaser nominations of 2,652,835 bbl., up 24,264 from October. Estimated natural-gasoline and condensate production of 321,997 bbl. daily wil bring total liquid-hydrocarbon production to 3,044,702 bbl. daily.

Two fields were given special allowables. Fullerton in Andrews County, and Willamar field in Willacy County will be allowed to produce only 20 and 12 days respectively.

The allowables by districts for November, with the decrease from the October 14 figure are:

		Decrease
1.—Southwest	33,444	169
2.—Southwest	154,392	1,918
3.—Gulf Coast	475,050	4,449
4.—Southwest	241,695	1,662
5.—East Central	45,746	556
6.—E. Texas (outside)	107,041	1,175
6.—East Texas	295,212	4,491
7B.—West Central	84,193	613
7C.—West Central	73,036	600
8.—West Texas	916,574	9,596
9.—North Texas	193,125	1,217
10.—Panhandle	103,197	2
Totals	2,722,705	26,808

The next state-wide hearing will be held November 14 in Austin. Discussion on the proposed reduction in the permissible gas-oil ratio from 2,000 cu. ft. of gas per barrel of oil to 1,000 will be delayed until December.

Gas Regulation

It can't be done on the common-carrier concept applied to other utilities, Marshall Newcomb tells the I.N.G.A.A.

Joseph A. Kornfeld

HOUSTON.—There is no need for the federal Government to apply the common-carrier concept to regulations of natural-gas utilities, Marshall Newcomb, Dallas, general counsel of Lone Star Gas Co., said here this week.

Speaking before the annual meeting of the Independent Natural Gas Association of America, the speaker declared that "natural-gas utilities are so fully and effectively regulated in all phases of their operations and business that the public interest is fully protected. Hence, there is no need to regulate them under a concept—the common-carrier concept—which cannot be realistically and practically adopted to their functions and obligations.

"No legislative enactment can alter the truth," the Dallas attorney stated. "Natural-gas public utilities render a public service which is distinctly different from the transportation service rendered by the conventional common carrier.

"It is obvious that neither long-term supply contracts nor long-term service commitments could be made by a common carrier which is a natural-gas public utility.

"It is too plain for argument," Newcomb added, that "common-carrier concept cannot be applied to natural-gas utilities consistently with the public-utility regulations to which they are now subject."

Impossible.—Declaring that "a natural-gas pipe-line company could not perform a common-carrier service when the distributing agency does not have a common-carrier status or obligation," Newcomb added that "it is impossible to find any workable basis for the operation of a natural-gas distributing system as a common carrier."

Stating that service to residential consumers is the primary service obligation of natural-gas utilities, Newcomb summarized arguments which prevent practical imposition of a common-carrier concept upon natural-gas pipe lines as follows:

"1. A common carrier of a natural-gas company could not undertake the transmission of natural gas from producers for delivery to industrial consumers and still meet its primary obligation.

"2. States could not enforce proration laws and protect correlative rights because the capacity of a common-carrier natural-gas pipe line might be, at a given time, completely saturated by the gas of shippers who have received prior commitments.

"3. Apportionment of the supply of gas among localities and consumers could not be affectually enforced, and the shipper would designate the consumer to which his natural gas was to be transported.

"4. Since the charge for transportation would probably be based on mileage and in the case of an integrated natural-gas company, intricate problems of allocation woud be involved which in many instances could not be rationally solved."

Newcomb was a member of a four-man panel that featured the 1-day convention. Other members were Scott Hughes, Dallas, vice president of Southern Union Gas Co.; Paul Kayser, Houston, president of El Paso Natural Gas Co.; and Thomas J. Reynolds, Los Angeles, vice president and general counsel, Southern California Companies. Hughes warned that "the broad application of common-carrier status to the existing natural-gas business has within its potentialities the very real possibility of altering the fundamental mode and manner in which we operate and of changing the essential nature of our business."

Interconnection urged. — Thomas C. Buchanan, vice chairman of the Federal Power Commission, told delegates that "interconnections of natural-gas pipe-line facilities are highly desirable and the industry should voluntarily seek to install and maintain such interconnections."

A recent FPC study has revealed the existence of a total of more than 200 points at which such interconnections could be made exclusive of possible interconnections in the congested West Virginia and Pittsburgh pipe-line areas, he said. This number includes possible interconnections between interstate and intrastate pipe lines.

Interconnections which Buchanan said would go far toward assuring adequate supplies of natural gas required in the defense effort include:

Transcontinental Gas Pipe Line Corp. and Texas Eastern Transmission Corp. in the New Jersey-Philadelphia area.

Transcontinental and Atlantic Seaboard in the Washington-Baltimore area.

Natural Gas Pipe Line Co. of America and Michigan-Wisconsin Pipe Line Co. in the Chicago area.

Michigan Consolidated Gas Co., Austin-Detroit pipe line, and Michigan Gas Storage Co. in the Detroit area.

Southern Natural and Trancontinental in the Atlanta area.

Kayser told the delegates: "I can see a substantial amount of disruption and confusion that can be brought about by pressing the common-carrier phase of the Federal Leasing Act."

Officers named.—Kayser was named president of I.N.G.A.A., succeeding Clyde H. Alexander of Dallas. C. P. Rather, Southern Natural Gas Co., was named first vice president; John F. Merriam, president, Northern Natural Gas Co., Omaha, was named second vice president; Fred Peters, Oklahoma Natural Gas Co., Tulsa, was reelected treasurer, and John A. Ferguson, Washington, D. C., was reelected executive director.

Elected to the board of directors were Henry Fink, president, Michigan Wisconsin Pipe Line Co.; William Marburg, president, Mississippi River Fuel Corp.; S. B. Irelan, president, Cities Service Gas Co., Oklahoma City; and A. M. Rippel, Phillips Petroleum Co., Bartlesville, Okla.

Octane Ratings

They continued to climb in motor gasoline during the third quarter, indicating no drain for military use

John C. Casper

OCTANE ratings for both premium and regular gasolines continued the upward trend in the third quarter, according to the October survey of E. I. du Pont de Nemours & Co., Inc.

Data from the report indicate that the over-all quality of automotive gasoline has not yet been cut by any shift of high-octane components to aviation fuel.

The unweighted arithmetic averages of figures for all cities in the survey show slightly larger gains for premium in the third quarter than in the second, while the increase for regular was only a little less than in the April-July period.

TEL content for both premium and regular was higher in October than in July, but the gain, expressed in cc. per gallon, was not as great as in the second quarter.

Out of the 45 cities where samples were taken either in the last week of September or the first week of October, 35 cities, or 77.8 per cent, had a higher average octane rating for premium gasoline than at the first of July. Cities with no change and cities with lower ratings for premium each accounted for 11.1 per cent of the total.

TEL content of premium gained in 26 cities, decreased in 17, and was unchanged in 2.

For regular gasoline, 29 cities had higher average ratings, 5 cities had the same average rating reported for July, and 11 cities had lower ratings. TEL content increased in 29 cities and decreased in 16.

GENERAL COMPARISONS*

	April	July	October
Premium—			
Research octane No.	89.4	89.8	90.3
TEL content (cc./gal.)	2.03	2.32	2.39
Regular—			
Research octane No.	83.2	83.5	83.7
TEL content (cc./gal.)	1.61	1.99	2.09

*Unweighted arithmetic averages of figures for 45 cities.

COMPARISON OF 1950 MOTOR-GASOLINE SURVEYS

(Octane numbers are by research method; arithmetic averages by cities)

	Premium				Regular			
	Octane number			TEL content cc./gal.	Octane number			TEL content cc./gal.
	April	July	Oct.	Oct.	April	July	Oct.	Oct.
Aberdeen, S. D.	86.6	87.6	88.9	2.58	80.4	81.3	82.4	1.73
Amarillo, Tex.	87.7	86.8	88.4	2.70	80.3	80.5	79.9	2.77
Atlanta, Ga.	91.0	91.6	92.2	2.24	84.9	85.0	85.9	2.52
Bakersfield, Calif.	88.8	88.7	89.2	2.82	80.6	80.8	81.1	1.90
Baltimore, Md.	91.8	92.3	92.8	1.76	85.6	86.3	86.7	1.56
Boston, Mass.	91.5	91.9	92.7	2.54	86.4	86.4	87.3	2.16
Calgary, Alta.	84.4	84.5	84.6	2.52	79.3	78.8	78.8	1.95
Casper, Wyo.	88.1	88.5	88.8	1.69	82.0	81.5	82.0	1.55
Charlotte, N. C.	90.9	91.1	91.9	2.29	84.8	85.2	85.3	2.04
Chicago, Ill.	88.2	89.1	89.4	2.23	82.6	82.8	83.1	1.78
Cincinnati, Ohio	89.8	90.9	90.4	2.67	85.1	85.3	85.7	2.27
Cleveland, Ohio	89.8	90.9	91.0	2.51	85.2	86.1	86.5	1.98
Columbus, Ohio	89.8	91.0	91.5	2.52	85.4	86.3	86.3	1.77
Corpus Christi, Tex.	92.2	91.3	92.0	2.13	85.1	84.7	84.6	2.46
Dallas-Fort Worth, Tex.	92.0	91.4	91.7	2.47	84.0	84.4	84.2	2.60
Denver, Colo.	87.6	88.3	89.2	1.93	81.4	81.0	81.3	1.55
Detroit, Mich.	90.2	90.4	90.5	2.50	84.2	85.8	86.0	2.14
El Paso, Tex.	85.5	86.0	86.2	2.99	76.5	78.5	79.7	2.59
Great Falls, Mont.	87.1	89.7	89.7	2.10	80.8	81.9	81.5	1.49
Houston, Tex.	92.2	92.2	92.6	2.44	84.9	85.9	85.6	2.54
Indianapolis, Ind.	88.1	89.3	88.8	2.72	83.0	83.6	84.2	2.72
Jacksonville, Fla.	90.6	91.0	91.5	2.33	85.6	85.9	86.2	2.38
Kansas City, Mo.	89.6	89.8	90.1	2.38	82.8	83.5	82.9	1.55
Little Rock, Ark.	90.6	90.3	90.6	2.68	84.2	83.9	84.5	2.27
Los Angeles, Calif.	90.1	90.8	90.7	2.62	82.8	82.9	83.0	2.05
Louisville, Ky.	90.9	90.6	91.3	2.87	84.5	84.7	84.8	2.81
Memphis, Tenn.	90.2	90.6	90.7	2.57	84.8	84.3	84.9	2.48
Milwaukee, Wis.	88.3	89.3	89.2	2.25	82.4	82.9	83.1	1.78
Minneapolis, Minn.	87.6	87.8	89.8	2.41	80.6	81.9	82.3	1.94
Montreal, Que.	88.7	88.8	88.8	2.27	84.2	84.5	85.0	2.18
Nashville, Tenn.	90.5	90.0	91.3	2.42	84.7	84.7	84.6	2.51
New Orleans, La.	90.5	91.4	91.6	2.66	85.6	84.6	84.9	2.45
New York, N. Y. (Met. area)	90.8	92.4	92.4	2.41	85.4	86.2	86.1	2.10
Omaha, Neb.	88.3	88.3	89.7	2.39	80.9	82.3	82.3	1.62
Philadelphia, Pa.	91.7	92.3	92.5	2.02	86.4	86.9	86.5	1.83
Pittsburgh, Pa.	91.6	91.2	91.8	2.31	85.8	86.6	86.2	2.36
St. Louis, Mo.	88.9	89.4	90.1	2.23	83.3	82.9	83.6	1.95
Salt Lake City, Utah	88.5	87.8	87.8	1.44	80.1	79.5	79.5	0.97
San Francisco, Calif.	90.7	91.3	91.5	2.39	83.2	82.9	82.9	1.73
Seattle, Wash.	90.9	90.9	90.9	2.36	82.7	82.2	82.6	1.53
Shreveport, La.	89.8	89.6	90.3	2.71	84.4	83.9	84.3	2.51
Spokane, Wash.	89.1	90.5	90.8	2.34	82.4	82.4	82.0	2.04
Toronto, Ont.	87.0	88.3	88.8	2.09	82.4	84.2	84.3	1.87
Tulsa, Okla.	88.6	88.7	89.8	2.56	81.3	82.2	82.4	1.98
Wichita, Kans.	86.8	87.1	87.8	2.37	81.3	81.2	81.5	2.38

Haslam Heads Pipe Line

NEW YORK.—United States Pipe Line Co., which proposes to build a common-carrier products pipe line from the Gulf Coast to the Midwest, has named Robert T. Haslam as president and a director. Haslam retired October 1 as vice president and director of Standard Oil Co. (N. J.).

Other officers of the company, which has offices in New York, are Paul Ryan, chairman of the board, and E. Holley Poe, vice president. It plans to construct a line, probably 16 in. in diameter, from the Beaumont-Port Arthur refining area of Texas through St. Louis and into the consuming areas of northern Illinois and Indiana *(The Oil and Gas Journal, September 28, page 55)*.

It is reported that the company has placed orders for the necessary steel and has completed financing arrangements with insurance companies, but no further details of the project have been revealed by the company since the original announcement.

Unique Building

Public views new home of Service Pipe Line Co.

Paul Reed

THE only building in the world designed and constructed specifically as the operating headquarters of a pipe-line system was opened for public inspection in Tulsa this week by Service Pipe Line Co., affiliate of Standard Oil Co. (Ind.).

It is among the largest office buildings constructed for oil-industry purposes and is unique in being owned and occupied entirely by a major pipe-line company as well as in being designed especially to serve the particular needs of such an operation.

"Now we have ample room and nearly perfect working conditions," President J. L. Burke said, referring to the many features constructed to the requirements of the company's various departments.

The six-story structure, on a downtown site, serves 500 of the company's 2,600 employes engaged in operation of the Service Pipe Line system which extends from Wyoming, New Mexico, and Texas to Whiting, Ind. After being under construction for 2 years, the building was completed July 15, 1950, with the exception of some interior finishing that delayed the formal opening. C. N. Scott, Jr., director and assistant general manager, was in charge of construction for the company.

Opening ceremonies began with a luncheon October 21 for a group of pipe line and other transportation executives which was addressed by Frank C. Rathje, Chicago, president of the Transportation Association of America.

Distinctive features.—In constructing the building, provision was made for possible later addition of four more stories to give a total of ten. Several distinctive features were developed for the building exclusively, including soundproofing, air conditioning, and the extensive use of marble in the corridors as well as "color dynamics" throughout the rooms.

Marble was used extensively because lower maintenance expense overshadows the slightly larger original cost. Changes in room space can be made overnight as a result of the manner in which movable walls have been made with prefabricated steel construction. All mechanical systems such as wires, valves, and ducts are readily accessible for repairs and changes.

Communications.—Because the heart of any pipe-line operation is communication and dispatching, the Service Pipe Line building includes special provisions for the telephone, telegraph, and teletype systems of the company. In addition to using 5,100 miles of telegraph and telephone lines, the company operates three microwave radio stations. Seventeen communication lines link the system with the Tulsa headquarters, and from this building the dispatchers control the flow of oil throughout the entire pipe-line system.

The extensive telephone system within the building includes facilities to permit as many as six individual instruments to be connected for a single conversation. Floors are of the "Q" type cellular construction which carries all wiring in integral conduits, with ample outlets to facilitate changes and additions to electrical and communications systems.

Comforts.—Unusual provisions have been made for the comfort and efficiency of employes. The building is completely air conditioned, and is soundproofed throughout with acoustical tile, carpets, and asphalt and rubber flooring. Special soundproofing is used in rooms where business machines are concentrated.

The elevator system is said to be the first in the world controlled entirely by the "autotronic" principle, and operations are adjusted to vary with changes in the volume and direction of traffic at different times of the day. The building also includes a lunch room, lounge, and cigar store for employes.

SOUTHWEST

Pipe Shortage

T.I.P.R.O. calls for more steel to end black market of tubular goods; new purchase plan suggested

Leigh S. McCaslin, Jr.

SAN ANTONIO. — More than 200 Texas independents meeting here last week heard five speakers and took action on major industry problems, chief of which was tubular-goods supply.

To eliminate the black market in oil-field pipe, directors of the Texas Independent Producers and Royalty Owners Association called on the Government for an additional 500,000 tons of steel annually, R. L. Foree, president of T.I.P.R.O., sent a letter to Secretary of Interior Oscar L. Chapman at the close of the meeting urging the increased allotment.

Foree asked that the industry's quota be raised from 1.7 million tons to 2.2 million tons, or 2 per cent of the nation's output. This extra steel is necessary, according to T.I.P.R.O., if the industry is to drill the 43,000 wells a year recommended by the National Petroleum Council.

Six oil men admitted at the independents' meeting that they had been paying black-market prices for pipe since the outbreak of the Korean war. Two others said they could not get pipe at any price. This information was duly recorded by two representatives of Sen. Lyndon Johnson's subcommittee on preparedness who were in attendance.

In another attempt to solve the critical steel shortage, Jack Woodward, independent operator, presented a plan developed by T.I.P.R.O.'s steel-requirements committee. Key to the proposal is a minimum government controls and a maximum of cooperation between the steel and oil industries. It would earmark 25 per cent of all tubular goods for spot buying. The purchaser would be required to furnish an affidavit to the supply house declaring he had none on hand and none available from other sources, give location and description of wells or leases for which pipe is intended, and agree to return the material if not used.

Resolution passed.—Other action by the T.I.P.R.O. directors included the passage of a resolution urging the Texas congressional delegation to "rectify the error" of the Supreme Court in the tidelands case, and another opposing the proposed reduction in the Texas gas-oil ratio limit from 2,000 cu. ft. per barrel to 1,000.

H. Roy Cullen, leading Houston independent, told the group that "we are gradually moving in the general direction of government operation of our industry." He asserted that this trend started when Harold Ickes became Secretary of Interior in 1933 and has been continuous since then. Cullen warned that the industry "may be nationalized before many years," if the trend is not reversed.

Bryan W. Payne, Tyler oil operator, called for greater cooperation within the oil industry. He told the group "it seems so needless for the different segments of the industry to be scrapping each other when the common battle is the tax gatherers in Washington."

In event of a major war, the United States would have at its call more than 7 million barrels of oil per day "without harm to the wells," Railroad Commissioner Ernest O. Thompson asserted. This total would include supplies from Canada, Mexico, and South America. (Current United States production rate is approximately 5,800,000 bbl. daily).

New devices. — Paul M. Erlandson, chairman of the Southwest Research Institute's physics department, told the group of two new devices of interest to the industry which are now under development by his group. The first is the vibrotron method, an unorthodox system of mineral prospecting; the other is the Bassinger rotary-percussion drill. Erlandson told the independents that he felt new studies should be made into the structure of the earth. Tremendous stores of energy are probably locked in the earth's core, he asserted.

Oil in War

If it comes, industry must act, Lutes says

SAN ANTONIO.—A picture of the United States oil industry in event of World War III was painted here last week by Lt. Gen. Leroy Lutes, commander of the Fourth Army.

The general told a director's meeting of the Texas Independent Producers and Royalty Owners Association that another major conflict would result in the following situations and actions:

1. Petroleum requirements undoubtedly will reach unprecedented levels.
2. A large-scale emergency pipeline-construction program will be necessary.
3. A large-scale tanker-construction program will be necessary.
4. Every drop of petroleum that the Western Hemisphere can produce will be required.
5. The supply of steel will be critical.
6. Manpower will be critical.
7. Additional refining capacity will have to be constructed in the early days of the war.

After enumerating what the mili-

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tary expects in any future major conflict, Lutes emphasized the importance of a strong petroleum industry. "The Department of Defense," he said, "has taken the position that our domestic industry should be healthy and vigorous."

The general said that the military expects two things of the United States petroleum industry. "In time of peace or limited emergency, such as at present, the types of products in the quantities required. In time of war, sufficient excess crude capacity to meet the increased demands that will be placed on this country by the fighting forces, our allies, and those neutrals whom we must support."

Concerned. — Lutes expressed some concern about the quantity of excess oil production available at the present time. He said we have only 600,000 bbl. daily of excess production capacity as compared with 1,000,000 bbl. at the beginning of World War II. Our present capacity, even if it were equal to that of 1941, "would not go as far toward closing the gap between supply and demand in a future war effort," the general stated. The greatly increased demand for petroleum products is the basis of this statement.

Lutes is well qualified to speak on the military aspects of oil. During World War II he was first deputy chairman of the old Army-Navy Petroleum Board, and later served as director of the staff of the Munitions Board. His primary duty was commander of the Army Service Forces, the army's major supply organization.

Permian's Week

Hawkins defense of oil highlights area show

Roy F. Carlson

ODESSA, Tex.—A vigorous defense of the oil industry's good citizenship and service to the public was delivered by Walace Hawkins, vice president of Magnolia Petroleum Co., before the Permian Basin chapter of the American Petroleum Institute here last week.

The meeting was one of several oil-industry gatherings held in connection with the Permian Basin Oil Show during Oil Progress Week.

Hawkins said that in spite of the industry's good record and its accomplishments it is in danger of interference and control by the federal Government, and he bitterly denounced government planners, visionaries, and uninformed public figures who constantly attack the industry and propose various forms of regulation.

The industry, Hawkins said, is furnishing 56 to 60 per cent of the total energy that is consumed in the United States, comparing this to 1925 when 71 per cent of the nation's energy was furnished by coal. Wages paid oil industry employes are high, he said, being $1.79 per hour in production, and $1.91 in refining. These figures he compared with $1.45 in the national manufacturing industry.

Hawkins said charges of excessive profits are poorly founded since the industry gets only 1 cent per gallon while paying government 2.5 cents per gallon in taxes. The number of competing companies in the industry illustrate the health of oil, in contradiction to the "planner's" charges.

The 4-day oil show was attended by an estimated 60,000 persons from West Texas and eastern New Mexico. More than 200 exhibitors displayed all types of equipment for drilling, cementing, acidizing and producing oil and gas wells.

WEST COAST

New Oil Provinces

Many areas in the Pacific states hold potentialities inviting exploration, speakers tell A.A. P.G. meeting

D. H. Stormont

LOS ANGELES.—Where possible future oil provinces will be found on the West Coast was the principal theme of the annual meeting of the Pacific section of the American Association of Petroleum Geologists here October 19-20.

Presented in the form of a symposium, discussions were held of the possibilities for new oil reserves in the three Pacific Coast states, and in the adjoining states of Utah, Nevada, and Arizona. Also covered were the probabilities for new oil reserves in the Kamishak Bay area of Alaska and in the Continental Shelf lying off Washington, Oregon, and California.

One California area which has been consistently ignored, according to W. H. Easton of the University of Southern California, is that portion of the state lying east of the San Andreas fault and east of the western edge of the Sierra Nevada. The portion of the region lying north of the Garlock fault he believed especially worthy of attention. Geologic conditions there are similar to those in northeastern Nevada, he stated.

Northern California. — Potentialities of the coast ranges north of San Francisco Bay were discussed by G. C. Gester of Standard Oil Co. of California. Some 8.5 per cent of this area, or about 1,700 sq. miles, he said is underlain by sediment rocks which are common to oil-field provinces. Because the basement is relatively shallow in a number of the favorable areas he estimated that only about 550 cu. miles might be placed in the classification of possible oil provinces.

Oil seeps in the outcrop and oil showings in Lower Cretaceous sediments in shallow wells in the western part of Sacramento Valley suggest the possibility of undiscovered oil reserves in that region, H. D. Hobson of General Petroleum Corp. stated. Additional gas reserves resulting from deeper and more intensive drilling he believed are a distinct possibility.

Eocene sediments have furnished the major portion of the region's gas production to date, Hobson stated, with anticlinal closures predominating the types of traps discovered. However, he said, "the variable distribution of formations and sand facies within the basin, together with the regional eastward overlap of middle and Lower Cretaceous sediments, suggests that some type of stratigraphic trap may be instrumental in the accumulation of a major portion of the discoverable reserves in this province."

Pertinent excerpts from some of the other papers on California's potentialities follow:

San Joaquin Valley.—J. E. Kilkenny of Chanslor-Canfield Midway Oil Co.: "Future fields will probably be found primarily in traps where the stratigraphic element is predominant, although there are a number of undiscovered fault traps and perhaps a few closed anticlines that have escaped detection. Deep prospects are better on the west side of the valley as numerous east-side wildcats have been drilled to basement in contrast to very few on the west side. The lower Miocene and older beds on the west side are probably devoid of oil and gas showings at great depths due to low-grade metamorphism."

Santa Maria Region.—B. C. Lupton of General Petroleum Corp.: "Prospective sediments in this province range in age from Eocene to Pliocene. They are marine, with exception of minor amounts of lower Miocene nonmarine beds near basement highs and a thin veneer of upper Pliocene and Pleistocene continental beds in the central portion of the province. It is probable that substantial undiscovered reserves of heavy crude exist in this province, and that lighter oils may be found in portions of the stratigraphic section

or in areas not before subjected to intensive search. Stratigraphic and structural studies may well be expected to yield important discoveries."

Imperial Valley.—L. A. Tarbet of Standard Oil Co. of California: "On the basis of surface data the possibility of obtaining commercial quantities of natural gas or crude oil appear to be very meager. Although a composite section of 22,000 ft. of sediments is exposed at many places in the western part of the valley, only 3,600 ft. are of definite marine origin."

Offshore Southern California.—K. O. Emery, University of Southern California: "The great depth of sea water eliminates most of the submarine area from consideration as possible oil provinces in the foreseeable future. It is believed that the submarine areas of Pliocene-Miocene or possible Miocene outcrops at comparatively shallow depths are the most favorable future oil provinces because of the probability that these sediments are similar in lithology, structure, and oil content to those in the Los Angeles and Ventura basins on land."

Ventura Region.—W. W. Rand of Union Oil Co.: "Nearly all of the anticlines and possible fault-trap areas in that part of the Ventura basin now above seal level have been tested to some degree by drilling. Other oil accumulations may be found by deeper drilling in some of the fields, and further exploration may discover additional fault-trap and stratigraphic-trap accumulations. Within the past 5 years, considerable exploratory effort has been expended in the submerged parts of the basin, and it appears possible that offshore discoveries will result from eventual drilling in these parts of the basin."

Washington.—In Washington the Tertiary rocks ranging from upper Eocene to Pliocene probably offer the best possibilities for the development of future oil and gas reserves, T. J. Etherington of California Standard said. Seepages of oil and gas are most abundant in the coastal belt, he pointed out, adding that evidence of petroleum is found in Eocene and Oligocene rocks inland, usually from water wells.

Oregon.—No oil seepages of oil sands are known to exist in Oregon, according to H. J. Buggenhagen of Shell Oil Co., Portland. Oil and asphalt, however, have been found in basalt vesicles, fossil cavities, and drusy cavities in quartz veins, he added. He considered the state's prospective oil territory to be limited to the coast-range province of northwestern Oregon and a part of the Ochoco Mountain region in the central part of the state. In these two areas there are thick sections of unmetamorphosed marine sediments, he said.

Arizona.—Opportunities for oil development in nonproducing Arizona were covered by E. D. McKee of the University of Arizona. The southern half of the state, where nearly all the valleys are filled entirely with continental deposits, he said offers little encouragement. The Plateau region, which covers most of the northern half, he said has certain features more favorable. Studies of the distribution and thickness of rocks similar in type and age to those producing oil in southern Utah and northwestern New Mexico, and possible basins of accumulation within them, were discussed by McKee.

Nevada.—Prospects for oil development in northeastern Nevada, where an intensive geological survey is under way, and in northwestern Utah were described by P. H. Dudley, Long Beach consultant. Structural and stratigraphic studies indicate there are anticlinal, fault, and stratigraphic traps within the area, he said. Devonian and Carboniferous and the White Pine shale of Mississippian age appear to be the best source rocks.

Other papers given included a discussion of the Calder field of Kern County, by Frank Carter of General Petroleum Corp.; Montalvo field of Ventura County, by Leo Moir, Jr., of Wilshire Oil Co.; and the Tejon Ranch area of Kern County, by Joseph LeConte of Richfield Oil Corp. Developments in Cuyama Valley were reported by A. S. Huey of Hancock Oil Co., while Frank A. Morgan, Richfield vice president, posed the question, "Is Petroleum Geology Geared for War?"

Officers.—Elected as new officers of the A.A.P.G. Pacific section for the coming year were Frank Carter of General Petroleum, president; Frank Parker of Signal Oil & Gas Co., vice president; and Jack Knight of British-American Oil Producing Co., secretary-treasurer. General chairman of the meeting, held in conjunction with the annual meetings of the Pacific sections of the Society of Exploration Geophysicists and Society of Economic Paleontologists and Mineralogists, was Frank Parker of Signal.

New Society of Exploration Geophysicists officers elected were: Robert Dyk, General Petroleum Corp., Bakersfield, president; John Sloat, Union Oil Co., Bakersfield, northern California vice president; F. H. Agee, United Geophysical Co., Inc., Pasadena, southern California vice president; and O. K. Fuller of Humble Oil & Refining Co., Los Angeles, secretary-treasurer.

L. J. Simon, The Texas Co., Los Angeles, was elected president of the Pacific section of Society of Economic Paleontologists and Mineralogists, while Douglas Crawford of Union, Los Angeles, is the new secretary-treasurer.

Price Raise

Union advances postings for heavy-type crudes

LOS ANGELES.—Union Oil Co. of California on October 20 announced an increase in the price of heavy crude oil, ranging from 25 cents per barrel for 14° gravity down, to no increase above 25° gravity, effective October 23.

The raise, which brings Union's price for 14°-gravity crude to an average of $1.85 per barrel, is the company's second increase for heavy crude this year, following three sharp cuts last year. It leaves the new price still about 35 cents per barrel under the 1948 level, however.

Standard Oil Co. of California and General Petroleum Corp. earlier last week raised their posted prices for heavy crude 10 cents per barrel for 14° gravity, bringing their prices into line with the $1.60 average previously set by Union.

By October 23 Union's latest higher price schedule had not been met by any of the other major purchasers, however. Furthermore, based on the slowness with which its increase of last July was met, it may be some time before other companies meet the new postings.

Union production.—Currently Union's daily crude production is about 65,000 bbl., of which 55,000 bbl. is in the Los Angeles Basin and coastal regions. The company's daily output of heavy crudes is around 27,500 bbl., making it the state's largest low-gravity crude producer. In addition Union's is purchasing some 7,500 bbl. in the San Joaquin Valley.

Total crude output from California fields last week was estimated to be 936,900 bbl. daily, highest level since April of last year and about 80,000 bbl. above the low ebb of last March. While exact figures are not yet available it is thought that almost all of this added production has resulted from reopening of shut-in heavy-oil producers. Since mid-June the state's output has jumped by about 56,000 bbl. Of this amount it is estimated that almost 50,000 bbl. came from wells which were shut in last year because of excess heavy-oil production. It is estimated that only about 20,000 bbl. of potential heavy-oil remains closed.

Inventories decline.—Reese Taylor, president of Union Oil, said that petroleum inventories are declining and "are now reaching abnormally low levels.

"The recent depressed prices of heavy crude oil have resulted in curtailed production and have made it extremely difficult to meet the currently increasing fuel-oil demands of the armed forces," he said. "This increase will have the effect of not only restoring shut-in wells but it

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should stimulate development work in heavy crude producing fields.

"Despite this increase in Union Oil's postings, the price of heavy crude oil is still substantially below the prices paid in early 1948."

GULF COAST

Tidelands Lease

Gulf Refining makes deal for area in Mobile Bay

MOBILE.—An oil and gas lease covering 684,000 acres of tidelands in Mobile Bay and adjacent Alabama coastal waters has been signed by Gov. James E. Folsom with Fred West of Fairhope, Ala., according to E. S. Morgan, state docks director. West said he represented Gulf Refining Co.

Morgan said West agreed to pay the state $34,000 a year lease rental plus one-eighth royalty in the event oil or gas is discovered. West was high bidder in public leasing conducted September 15.

The area covered by the lease is state owned, Morgan said. It does not extend to the disputed area of the Gulf of Mexico where the federal Government claims title.

Although the state has leased Mobile Bay areas before, relatively little exploratory work has been conducted.

Interest in Mobile Bay has been revived due to the discovery this spring of a field 40 miles northeast of here at South Carlton in Clarke County. The discovery well was Humble Oil & Refining Co. 1 Marion Wall Davis in Section 15-3n-2e, which was completed for an initial production in excess of 200 bbl. of oil per day. Producing horizon is from 5,419-28 ft. in the Eutaw series of the Gulfian Cretaceous. Humble has started the south offset to this discovery.

Gilbertown field.—Only other producing area in Alabama is Gilbertown field, discovered in 1944 and located 130 miles northwest of Mobile and a few miles east of the Mississippi state line in Choctaw County. Gilbertown has yielded to date more than 2,400,000 bbl. of oil. Currently it is producing approximately 2,000 bbl. of oil per day from 42 wells. The Eutaw sand is productive from a depth of about 3,500 ft.

Water-Flood Expansion

SHREVEPORT. — Work will start this month for expansion of waterflood operations in the Haynesville field, Claiborne Parish, Louisiana. No additional investment will be required except for the cost of construction of flow lines from the filtering plant to the injection wells.

Three marginal oil wells situated in the south end of the field will be converted to water injection wells as follows: Unit Nos. 26-8, 27-7, and 35-3, all in 23n-8w.

Water will be returned to the upper Pettit "A" zone which has been subjected to gas injection since January 1945 and water injection since March 1946. Currently operators are injecting about 19,000 bbl. of water per day in 30 injection wells at an average pressure of 2,396 psi.

Cumulative water returned as of May 1, 1950, was 17,742,366 bbl., of which 1,907,335 bbl. was produced, leaving 15,834,831 bbl. net injected.

MEETINGS

Silver Anniversary

C.N.G.A. to hold fall meeting November 9-10

LOS ANGELES. — Progress of the natural-gas and gasoline industry during the past quarter century will be the main theme of the twenty-fifth anniversary meeting of the California Natural Gasoline Association here November 9-10.

Convening at the Ambassador Hotel, the group will mark its silver anniversary with a program dealing with all phases of the industry. Papers will give natural-gasoline men a better appreciation of their role in the petroleum industry and the petroleum industry will acquire a better understanding of the functions and problems of the natural-gas and gasoline men.

R. S. Tulin, president of the association, will be in charge of the silver anniversary luncheon which will be held November 10.

The papers will include:

November 9.—Forum 1, "The Efficient Operation and Maintenance of Plant Equipment," J. B. Taylor, Signal Oil & Gas Co., chairman; "Preventative Maintenance and Operation of Cooling Equipment," Harold Dresser, Marley Co., Inc.; "Preventative Maintenance and Overhaul of Pumps," Paul Armstrong, Union Steam Pump Sales Co.; "Operation and Maintenance of Boilers and Air Receivers," W. A. Carter, Pacific Indemnity Co.; "Paints—Their Uses and Applications," J. M. Hebden, Socony-Vacuum Oil Co., Inc.

Forum 2, "Application of Chemical and Process Engineering Principles to the Efficient Design and Operation of Natural Gas Processing Plants," C. D. Gard, Union Oil Co., chairman; "Check List of Process Engineering Fundamentals," Dr. Frank J. Lockhart, University of Southern California; "Efficiency Characteristics of Commercial Absorbers," Ed G. Ragatz, associate, J. B. Gill Co.; informal discussion of "Importance of Non-Equilibrium Phenomena in the Design of Natural Gasoline Plants," Dr. B. H. Sage, California Institute of Technology; "Removal of Non-Hydrocarbon Constituents From Natural Gas," Arne Eriksen, Girdler Corp.; "Tray Efficiencies of Bubble Tray Absorbers," John C. Harper, California Research Corp., now associate professor, University of California engineering department; "Recent Developments in Multi Component Distillation Calculations," Donald N. Hanson, assistant professor of chemical engineering, University of California.

Forum 3, "The Role of the Chemist and Laboratory in Efficient Natural Gas Operation," W. W. Robinson, Jr., The Texas Co., chairman; "Reservoir P-V-T Relations and Natural Gas Manufacture," Dr. B. H. Sage, California Institute of Technology; "Testing Gasoline Plant Absorber Performance," R. A. King, Union Oil Co.; "Testing Gasoline Plant Rectifier Performance," R. E. Baker, General Petroleum Corp.; "Testing Gasoline Plant Operating Efficiency," J. B. Armstrong, Standard Oil Co. of California; "Gasoline Plant Water Treatment," B. J. Willard and T. L. McCaleb, The Texas Co.

Forum 4, "Progress in Gasoline Plant Equipment and Design," M. W. Kibre, General Petroleum Corp., and L. V. Leonard, Shell Oil Co., cochairman; "Gasoline Plants of Yesterday and Today," J. A. Campbell, J. A. Campbell Co.; "Modern Design of Gasoline Plants," R. B. Cragin, Refinery Maintenance Co.; "Report on Performance of Perforated Plate Tower," H. R. Marsh, J. B. Gill Co.; "Progress in Atmospheric Cooling Methods in Natural Gasoline Plants," G. H. Dieter, Fluor Corp., Ltd.; "Pumping Trends in Natural Gasoline Practice," Paul Armstrong, Union Steam Pump Sales Co.; "Proper Application of Multi Cylinder Gas-L.P.G. Engines for Gasoline Plant Requirements," John W. Tucker, Hall-Scott Motor Division; "Gas Purification Processes," A. H. Kohl, Fluor Corp., Ltd.; "Welding—Past, Present and Future in Refining Industry," S. R. Lanier, Southwest Welding & Manufacturing Co.

Forum 5, "The Efficient Management of Natural Gas and Natural Gasoline Operations," William A. Kirk, California Southern Oil Co., chairman; "Organization—The Working Tools of Organization Control," L. L. Purkey, manager, department of organization, Standard Oil Co. of California.

November 10.—Morning session, George C. McLaren, chairman; "The C.N.G.A. Technical Committee — What We Accomplished in 1949, and Our Plans for 1950," A. C. Lyles, General Petroleum Corp.; "Attaining Over-all Efficiency in Natural Gas and Natural Gasoline Operations," R. W. Heath, Signal Oil & Gas Co., moderator; "The Conservation of Natural Gas," T. L. Taggert, Standard Oil Co. of California.

Afternoon session, Frank J. Colton, chairman; "The Light Hydrocarbons—Their Contribution to the American Way of Life," Warren H. Kraft, Honolulu Oil Corp.; "Human Relations in the Natural Gas and Natural Gasoline Industries," H. L. Eggleston, analyst; "Twenty-Five Years of C.N.G.A.—Its Service to the Industry," R. S. Tulin, Shell Oil Co., C.N.G.A. president.

Reprint Available

The 36-page article on "Deep Rotary Drilling" which appeared between pages 141 and 189 of the Journal's issue of October 5, 1950, has been reprinted as a pamphlet in response to many requests from the industry. This is a detailed, step-by-step account of a drilling operation conducted by Ohio Oil Co., and the two-color reprint includes all of the action photographs, drawings, and explanatory text as they appeared in the Journal. Prices are: Single copies, 50 cents; 2-9 copies, 40 cents; 10-49 copies, 30 cents; 50 or more, 25 cents each. Address: Reader Service Department, The Oil and Gas Journal, P. O. Box 1260, Tulsa.

One light rig is now in use by N.P.P.M. Here is shown a close-up view of drilling of 3 Minas. Note the large cooling fan to the left of the derrick floor.

ASIA

Jungle Operations

Difficulties of isolated jungle location fail to retard oil-development program by Caltex affiliate in Sumatra

Dahl M. Duff

DESPITE the difficulties of an isolated jungle location, an operating affiliate of Standard Oil Co. of California and The Texas Co. is making unusually rapid progress in a development program in central Sumatra.

Field operations were resumed in January of last year. It proved to be a major task to reassemble personnel, open roads, rebuild camps, and move in equipment and supplies. However, five wells have now been completed in Minas field, and other exploratory operations are being carried out.

The company is Nederlandsche Pacific Petroleum Maatschappij which holds operating contracts covering some 2,400,000 acres in central Sumatra. Minas field now under development is situated about 25 miles north of Pakanbaru, a town of about 10,000 population located at the head of navigation on the Siak River.

The Minas area has an interesting history. N.P.P.M.'s early exploratory work in central Sumatra led to the finding of the structure in 1935-37. Equipment was in place for spudding in a test on this prospect when the Japanese invasion overran all of the Dutch East Indies.

Jap occupation.—During the occupation, the Japanese drilled the well and made the discovery on the N.P.P.M. location. When N.P.P.M.'s representatives first reentered the area in 1946, they found 1 Minas a producing well and also were able to recover the systematic production records that had been kept by the Japanese. A makeshift assortment of refining equipment also had been assembled at Minas and on the shore of the nearby Mandau River by the Japanese.

Although the company resumed field operations in January 1949, the first step was reconstruction of ter-

The industrial area at N.P.P.M.'s Rumbai camp. The warehouses at left are 60 by 120 ft. each.

Houseboats at the Pakanbaru terminal now used as bachelor living quarters. Part of a converted LCM (landing craft, mechanized) is visible at right.

minals and camps, road repair, and assembling of equipment and supplies. Drilling was started again in December 1949 on 2 Minas, a few miles from the discovery, The 3 Minas was drilled and completed in March.

The five wells which the company now have are completed in the lower Miocene at about 2,500 ft. The structure is that of a low-dip cone; gravity of the oil is 35° A.P.I. All present drilling is in conformity with a plan of widespread wells to determine the field's potentialities in order to devise appropriate oil-gathering and transport facilities. In addition to the Minas development, the company is preparing to spud in an exploratory well in an area some 20 miles southwest of Pakanbaru.

Near equator. — Pakanbaru itself is

This is a view of the Pakanbaru terminal showing the storehouse area and the dilapidated wooden pier built by the Japanese.

New Kenworth truck with a load of casing for a well at Minas.

These are living quarters at the Minas camp of N.P.P.M.

only 35 miles from the equator, and conditions in this hot, humid region creates numerous problems to normal oil-development work. Elephants, for example, have been known to tear up pipe lines and telephone poles. Rainbelt forest covers the area, and road building and maintenance are extremely difficult.

Standard Oil Co. of California first showed an interest in the oil possibilities in central Sumatra in 1924. N.P.P.M. was formed in 1930 to acquire exploration and drilling rights in the islands. Six years later The Texas Co. acquired a half interest in the company. Today, N.P.P.M. forms an entity within the Caltex group.

Head administrative offices of the operating company in Indonesia are located at Djakarta, the Indonesian capital. Present field offices are maintained in Pakanbaru. Small ocean-going steamers freight supplies from Singapore. It is approximately 90 miles from the Siak River's mouth to Pakanbaru. As of the middle of this year, N.P.P.M. had 943 employes, comprising 28 Americans, 65 Dutch, and 850 Indonesian nationals.

Prior to the war N.P.P.M. had discovered oil in two additional fields to the north of the Minas structure. These are Doeri, some 40 miles from Minas, and Sebanga, about midway between Midas and Doeri. In Doeri, four producing wells were completed in 1940-41. In Sebanga, three producers were completed prior to the Japanese invasion.

Red China's Oil Mystery

WASHINGTON.—A Senate investigation of American trading with communist China brought charges last week that at least 11,500 bbl. of lubricating oil was permitted to leave Japan for Chinese ports after the invasion of Korea began.

A committee headed by Sen. Herbert R. O'Conor of Maryland, which is investigating the matter, was unable to ascertain who owned the oil at the time it was in Japan, but following a closed meeting with State, Commerce, and Army officials O'Conor said six or seven vessels were used in moving the oil to China, all but two or three of which were under American registry.

No charge was made of any illegality on the part of American shippers of the oil, which reached Japan last March and April when no export licenses were required. The committee, however, was interested in finding out why the movement of the oil from Japan was permitted by the Supreme Commander Allied Powers which controls all Japanese foreign trade.

Efforts to secure information from Quincy Adams, chief of the economic branch in the Army's office of occupied areas, as to how the oil was permitted to leave Japan brought only the response that the details were classified, as is information on Army restrictions on shipments to the Red areas about which he also was questioned.

Adams did say, however, he had learned that one SCAP official recommended removing 5,000 bbl. of oil from the "Flying Cloud," which ran the Chinese Nationalist blockade, and the oil was taken off under the protest of the ship's captain.

AFRICA

Products Line Considered

Construction of a new 225-mile petroleum-products pipe line from Ango-Ango to Leopoldville in the Belgian Congo is being studied by several companies marketing in the area.

The new line, to be of 6 or 8-in. diameter, would parallel the existing 4-in. now operated over the route by Petrocongo, a subsidiary of Cie. Financiere Belge des Petroles, S.A. (Petrofina), a leading Belgian refining and marketing company.

Ango-Ango is on the Congo River about 35 miles from the Atlantic. The pipe-line route rises to about 3,900 ft. and crisscrosses the Congo River before reaching Leopoldville, considered the most modern city in West Africa, with a population of about 135,000.

The new line is regarded as necessary not only because of increased consumption in the Leopoldville area but also because of the fact that the existing 4-in. is limited to gas oil and dirty products. The new line, for white products, like the present 4-in., presumably would be used by Socony-Vacuum Oil Co., Inc., Shell, and the Texas Co. as well as the Petrofina subsidiary. The river is not navigable, and the existing railroad to Leopoldville is considered unsatisfactory for movement of petroleum products.

Plans for the new line are still in the formative stage. The desirability of its construction is, however, recognized. The Belgian Government's 10-year development plan is intended to encourage such projects by private capital.

FAR EAST

Nippon's Refineries

Imports halved by rehabilitation program which meets minimum needs excepting gas oil and lubricating oil

Bertram F. Linz

WASHINGTON. — Japanese imports of refined products have been sharply reduced as a result of a rehabilitation program for nine refineries worked out by occupation officials, from 905,700 bbl. in January to 436,153 bbl. in June. Present production of these plants, located along the Pacific Coast, when added to that of the indigenous refineries, meets the minimum requirements of the Japanese economy with the exception of gas oil and lubricating oil.

A report on the program was submitted to Supreme Commander, Allied Powers by Joseph K. Kelsey, assistant superintendent in charge of lubricating-oil manufacture at the Socony-Vacuum Oil Co., Inc., refinery at Paulsboro, N. J., who has just returned from an 8-month tour of service as visiting expert consultant to the Allied High Command. This indicates an early lack of cooperation between the companies and the Japanese Government to increase refinery operations which apparently now has been largely overcome. During a lapse of 2 months between his predecessor's departure and his arrival, Kelsey reported, there was a lack of supervision which resulted in much of the rehabilitation work and future planning not being in the best interest of the program.

Refineries. — The refineries included in the rehabilitation program were those of the Showa Oil Co. at Kawasaki, to have a topping capacity of 6,000 bbl. daily and a crude allotment of 4,000 bbl.; Toa Nenrye Oil Co. at Shimizu, with a capacity of 5,000 bbl. and a crude allotment of 4,000 bbl., and at Wakayama, to have a capacity of 10,000 bbl. and a crude allotment of 6,000 bbl.; Nippon Oil Co. at Yokohama, capacity 6,000 bbl. and allotment 4,000 bbl., and at Kudamatsu, capacity 6,000 bbl. and allotment 4,000 bbl; Daikyo Oil Co. at Yokkaichi, capacity 1,200 bbl. and allotment 1,000 bbl.; Maruzan Oil Co. at Shimotsu, capacity 7,000 bbl. and allotment 3,000 bbl.; Mitsubishi Oil Co. at Kawasaki, capacity 4,000 bbl. and allotment 3,000 bbl., and Koa Oil Co. at Marifu, capacity 5,000 bbl. and allotment 3,000 bbl.

The refineries were slated to go into operation at the beginning of the year but were late in getting under way and almost immediately experienced difficulties with the crudes received which in many instances were not satisfactory for the programed purpose, necessitating changes in specifications.

Crude contents.—Some of the crudes received contained excessive amounts of heavy fuel and asphalt, and some refineries enlarged their facilities to make additional asphalt, without advance knowledge of GHQ which would never have permitted it, resulting in production of asphalt far in excess of demand.

However, Kelsey said, the crude purchased for the first 6 months' operation was not too big a blow to the program since, being very asphaltic, it gave a large yield of straightrun gasoline of marketable quality with the addition of about 1 cc. of TEL per gallon, and enabled the refineries to get into production of lubricating oils almost from the start.

Kelsey reported that inspection trips early in the year showed that practically all the refineries were devoid of fire protection. Instructions were issued to all companies to complete their fire protection at once but this was not done in the majority of cases, and in some instances is only now being installed.

Another impediment to efficient operation was the practice of Japanese utility companies, from which refineries purchase electric power, to interrupt service when their distribution systems need repairs or maintenance, generally with insufficient notice to users. The power companies were requested to give at least 12 hours' notice of such interruptions, and generally have complied, Kelsey said.

As operations got under way it was found that the refineries, which were required to submit firm estimates of their operations for 1 month and general estimates for the following 2 months of each quarter, were overly optimistic and it became necessary for SCAP to institute a system of monthly meetings at which the estimates could be worked out to operating levels that could be maintained.

Equipment squabble.—Kelsey's report also cited reluctance on the part of the Japanese Government to cooperate freely in the rehabilitation program, which contemplated the transfer of usable equipment from the arsenal refineries to the various Pacific Coast refineries to compensate for known deficiencies, particularly for the manufacture of lubricating oils. This plan was almost completely blocked by the government on the pretense that without the rehabilitation of the arsenal refineries, the installed capacity and planned expansion of the Pacific Coast refineries would be insufficient to meet normal civilian economy needs. By the time this claim was refuted the operating refineries had arranged to procure equipment from other sources and release of the arsenal equipment now will contribute little to refinery capacity.

"This arbitrary delay on the part of the Japanese Government is one of the largest factors contributing to present lack of lubricating-oil facilities," Kelsey said in his report, estimating it will cost the program 500 or 600 bbl. daily of lubricating oil for more than a year.

The refinery program was established for the purpose of minimizing the foreign exchange necessary to supply the Japanese economy with its minimum requirements of petroleum products by importing crude and refining it locally. Currently most of those requirements can be met except for heavy fuel oil and lubricating oils.

There is still much to be done before the Japanese refineries will be operating on an efficient basis which will permit maximum recovery of product from the crudes charged, Kelsey said. To achieve maximum benefit from the program, he recommended changes in refinery procedures and initiation of a personnel-training program to overcome the loss of skilled and competent workers during the period of the refineries' inactivity.

"The refineries, after being seriously damaged during the war, were idle and neglected for the following 4 years," Kelsey pointed out. "During their reconstruction period, materials, workmanship, and deliveries were not usually those desired. Considering all these handicaps it is felt that the recovery of the petroleum refining industry is commensurate with that of other industries."

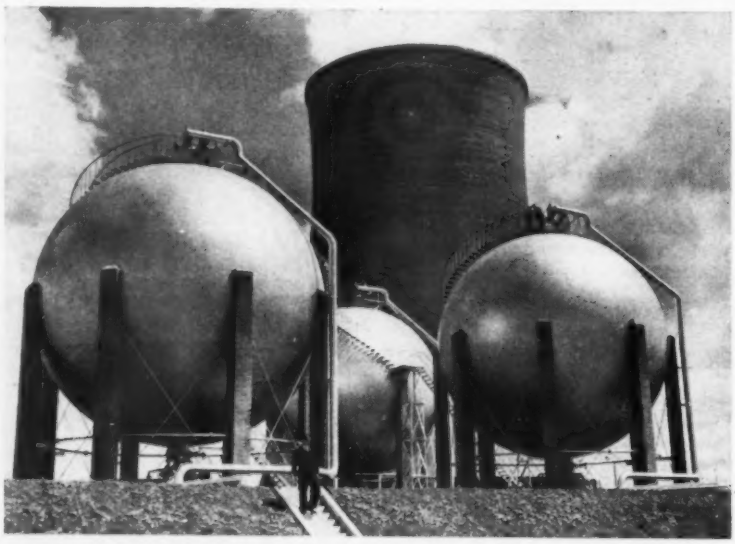
CARIBBEAN

New Curacao Facilities

A new lubricating-oil manufacturing plant will be built at the Curacao, West Indies, refinery of N. V. Curaosche Petroleum Industrie Mij., Royal Dutch Shell subsidiary. The new facilities will process crude fractions already available at the 200,000 bbl. per day refinery, and will not entail any increase in crude runs, according to company representatives.

Four modern processing units will comprise the new plant: a propane deasphalting unit, a furfural refining unit, a solvent dewaxing unit, and facilities for clay contacting. Contract for construction of the plant

XUM



TOWER AND SPHERES.—The tallest concrete cooling tower in the world (341 ft.) of the type popular with European refiners but unknown in the United States, looms behind three spherical, high-pressure, butane storage tanks, the first ever erected in the United Kingdom, at the new Shell refinery at Stanlow on Manchester Ship Canal.

has been let to the firm of Werkspoor, Inc., of Amsterdam. Completion and initial operation are anticipated for mid-1953. Werkspoor will send about 200 technical men to Curacao to supervise construction, and Texaco Development Corp. and other American licensors of the processes to be employed will cooperate in planning design and erection.

The CPIM plant at Curacao will be the second modern lube-oil plant to be constructed in the Caribbean area. Now under erection is a 2,000-2,500 bbl. per day plant at the new Punta Cardon refinery of Venezuelan Oil Concessions, Ltd. The Cardon plant includes at 2,560 bbl. per day deasphalting unit, a 6,350 bbl. per day furfural refining unit, a 3,520 bbl. per day solvent dewaxing unit, and a clay contacting unit with a capacity for handling 3,700 bbl. of charge per day.

LATIN AMERICA

Refinery Dedicated

Sinclair completes new Puerto La Cruz plant

By Dahl M. Duff, the Journal's International Editor, who personally attended the dedication ceremonies.

PUERTO LA CRUZ, Venezuela.—Sinclair Oil & Refining Co.'s new plant, with a daily capacity of 35,000 bbl., was formally dedicated here October 21 in the presence of a group of Venezuelan and company officials.

The refinery, completed 3 months ahead of schedule, provides topping and treating facilities for Santa Barbara-type crude which is received through Sinclair's existing 100-mile, 12-in. line from fields to the south and east.

Dr. Manuel R. Egana, Venezuelan Minister of Fomento, in a speech at the dedication said the refinery's inauguration was highly pleasing to the Venezuelan Government, first because it represented a continuation of the policy of refining the greatest possible portion of production in Venezuela; secondly because it showed the confidence of foreign capital in the economic and political stability of Venezuela; and thirdly because of the economic benefits to Venezuela of a new industrial enterprise.

New area.—The minister mentioned Sinclair's recent Guere discovery in Eastern Venezuela and said it is to be hoped that this new area will become one of the larger producing fields in the country. Edward L. Steiniger, president of Venezuelan Petroleum Co., of which Sinclair Oil & Refining is a subsidiary, presided at the inauguration. In addition to Egana, other guests included Dr. Falcon Bricena, governor of the State of Anzoategui, and E. J. Sparks, Charge de Affairs for the United States in Venezuela.

The Sinclair refinery was built by Frederick Snare & Co., New York. Sinclair has operated a crude-loading terminal at Puerto La Cruz for the last 7 years, and the tanker dock will now serve both the refinery and the terminal. Besides the process equipment, the refinery project included customary utilities, employe housing, testing laboratory, machine shop, carpenter shop, and warehouse.

The Snare organization has had considerable contracting experience in Latin America, but the Sinclair plant represented its first project in the oil-refining field.

Brazil Refinery Operating

Brazil's new refinery at Mataripe near Salvador in Bahia went into initial operation the latter part of September. It has a capacity of 2,500 bbl. daily.

The refinery, which will operate at full capacity in a month or so, will provide the first important commercial utilization of the crude production which Brazil's Conselho Nacional do Petroleo has developed in the area.

The Bahia refinery, equipped with a combination thermal cracking unit, was built by M. W. Kellogg Co. which is now assisting in the training of Brazilian nationals in its operation. Certain of the auxiliary facilities built by the Brazilian organization are not yet fully completed.

The refinery operation was inaugurated in a ceremony attended by a number of high Brazilian government and military officials, including Gen. J. C. Barreto, president of the conselho.

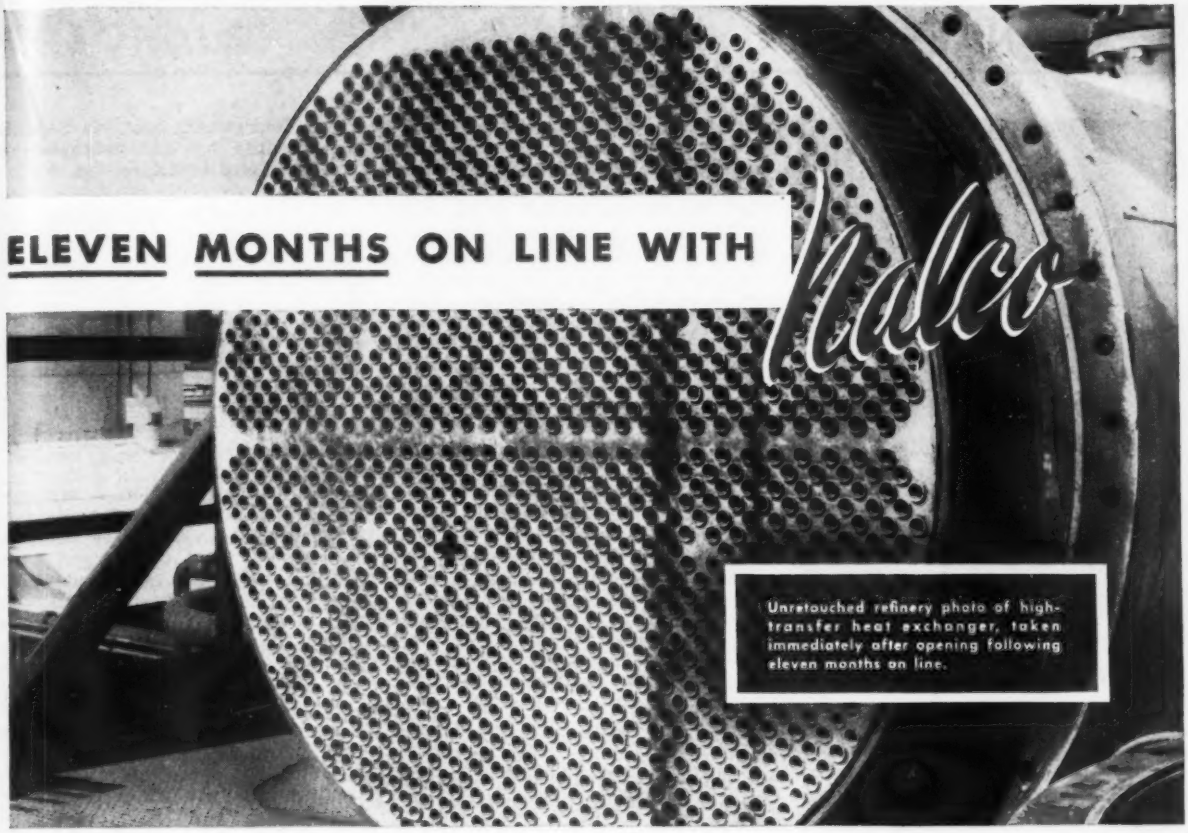
Creole Operations Report

Average number of rigs in operation by Creole Petroleum Corp. in Venezuela showed a slight increase in August.

The company's monthly operations report lists 6.7 rigs running during the month. This compares to a 5.8 average in July. During August, five completions were made, including two exploratory wells. One was in Pedernales at 6,977 ft., with 900 bbl. daily initial production, and the other was in Quiriquire at 5,147 ft.

Creole, the largest producing company in the Western Hemisphere, also showed an increase in crude output during August. Operated production totaled 649,253 bbl. daily against 625,116 bbl. daily in July. Of the August output, 498,235 bbl. daily came from Lake Maracaibo, 3,709 bbl. from Cumarebo and Mara, and 147,309 bbl. daily from eastern Venezuela. Creole's net production plus purchase royalty oil in August averaged 684,399 bbl. daily.

During August, the Creole refinery at Caripito in eastern Venezuela ran 64,088 bbl. daily against 59,984 bbl. daily in July. Runs at Amuay in August averaged 20,746 bbl. daily, compared to 42,668 bbl. daily in July.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XUM

President

Hamon named head of Mid-Continent group

JAKE L. HAMON has been elected president of Mid-Continent Oil and Gas Association, succeeding Frank Porter, who resigned after becoming president of American Petroleum Institute.

A native of Lawton, Okla., Hamon received his education there and at the University of Chicago. He entered the oil business in 1921, when he left school to drill a well in the Ranger field of Texas. Shortly afterward, he began contract drilling at Ardmore, Okla., in partnership with Hughes Sterm. The two continued in business together until 1924, when Hamon decided to branch out into the producing business.

He formed a partnership with Edwin B. Cox of Ardmore, and the firm operated in Oklahoma, East Texas, and southwest and west-central Texas until it was dissolved this year.

Moving to Dallas in 1935, Hamon served as president of the Texas Mid-Continent Oil and Gas Association from 1934 to 1936, and president of the National Stripper Well Association from 1936 to 1938. He has served as a director of A.P.I., and is a director of East Texas Salt Water Corp. and Independent Petroleum Association of America.

He is past president of the Brook Hollow Country Club and the Dallas Petroleum Club, and is a director of the Cotton Bowl Association.

Robert Raymond, geological scout and landman for Skelly Oil Co. for the past 6 years, has resigned to become an independent.

Radcliffe H. Beckwith, senior geologist for Union Oil Co. of California at Laramie, Wyo., has been transferred to the new Roswell, N. M., office. Others transferred to the new office include: **Raymond E. Corcoran, Jr.,** and **Daniel F. Merriman,** assistant geologists from Denver to Roswell; and **Edward J. Matchus,** assistant geologist and scout, from Cut Bank, Mont., to Roswell. **Raymond Chorney,** senior geologist, was transferred from Casper, Wyo., to the Midland division.

Eugene P. Lancaster, Tulsa, former paleontologist for Shell Oil Co. in the Mid-Continent area, has joined the Midland Paleontological Laboratory staff.

Charles G. Page, assistant area manager of Sinclair Refining Co., has been appointed chairman of the automotive and petroleum section in the Chicago Community Fund's trades industries division.

Victor P. Reiserer has resigned from Superior Oil Co. of California as Kansas and Nebraska district geologist, to become an independent consultant.

Gus Hiller, chemical engineer for Cities Service Oil Co., has been transferred to the cat cracking section of the Baton Rouge refinery, and **W. J. Burch, Jr.,** chemical engineer, has been transferred to the thermal cracking section. **Stan Granberry** will replace Hiller, and **W. R. Jacoby** will replace Granberry as supervisor of the commercial correlations section at the plant.

C. C. Phillips and **Frank S. Williams** have been made vice presidents of Ohio Fuel Gas Co., subsidiary of the Columbia Gas System.

C. C. PHILLIPS

F. S. WILLIAMS

Phillips joined the company in 1910, and has been a member of the board of directors since 1946. Williams has been with the firm since 1927, and was recently named head of the business promotion department.

John Duncan, Jr., of Quitman, Ga., has been appointed to fill the vacancy in the Georgia Oil and Gas Commission created by the resignation of **T. Ross Sharp** of Lyons, Ga.

W. B. BROWN

William B. Brown has been elected president of Esso Standard Oil (Caribbean), S. A., with headquarters in Ciudad Trujillo, the capital of the Dominican Republic. He was graduated from the University of Delaware and later completed the advanced management course of the Harvard Business School. He joined the Esso firm in 1931, and was named a regional manager for the Standard Oil Co. of Brazil in 1943. The following year Brown was elected a director of Standard Oil Co. (Chile) S. A. C., and returned to the United States in 1946 and has since been associated with the public relations department of Standard Oil Co. (N. J.) as liaison head for public relations with affiliated companies. Brown succeeds **R. C. Horne** who recently became vice president and general sales manager of Esso Sociedad Anonima Petrolera Argentina, Jersey Standard's principal marketing affiliate in Argentina.

Richard G. Lawton, vice president of Independent Petroleum Association of America for Arkansas and vice president of McAlester Fuel Co., Magnolia, Ark., has announced the formation of the new Lawton Oil Corp. which will be headquartered in Magnolia with interests in Arkansas, Louisiana, Texas, and New Mexico. Lawton, who has been with McAlester for 15 years, will be president of the new organization, and will retain his former connection in an advisory capacity.

L. J. Alford, J. Justice, Jr., F. C. Moore, and **B. L. Simmers,** rotary drillers for Shell Oil Co., have been transferred from Houston to the Wasson, Tex., district.

J. E. Green, Shell Oil Co., has been elected president of the newly organized Pipe Liners Club of Houston. Other officers include: **F. O. Stivers,** Humble Pipe Line Co., vice president; **O. R. Tisdale,** Tidal Pipe Line Co., secretary; **E. L. Ebbs,** Tidal Pipe Line Co., treasurer and assistant secretary; and **P. D. Phillips,** Humble Pipe Line Co.; **W. L. Shannon,** Gulf Pipe Line Co.; **W. C. McGee, Jr.,** Tennessee Gas Transmission Corp.; and **H. A. Johns,** Gulf Pipe Line Co., were elected to the board of directors.

PERSONALS

Paul S. Strain, chemical engineer for Standard Oil Co. (Ind.) at St. Louis, has been transferred to Wood River, Ill., in the same capacity.

H. A. BUSTEN

Harry A. Busten has been appointed general traffic manager for Warren Petroleum Corp., Tulsa, succeeding the late N. A. Lindsay. He has been with the firm since 1928, and previous to this was chief clerk to the vice president in charge of operations for the Fort Smith & Western Railroad. Busten announces the following appointments: **Oscar W. Utz,** assistant traffic manager in charge of rates; **Ray E. Cramberg,** assistant in charge of L.P.G. transportation; **Douglas A. Collins,** assistant in charge of natural-gasoline transportation; and **H. G. Cosby,** assistant in charge of the Houston district.

L. E. Sloan, formerly district production superintendent at Pampa, Tex., for Stanolind Oil & Gas Co., has been named district superintendent in charge of the new district office at Abilene, Tex. **J. B. Jenkins,** formerly at Pampa, has been transferred to Abilene as district engineer. **J. O. Fair,** formerly at Rangely, Colo., has been transferred to the new area production office at Sweetwater, Tex., as field superintendent in charge of the area office; and **J. H. Larson,** formerly at Midland, Tex., has been transferred to Sweetwater as field engineer. The district production office at Pampa will be closed, and the area office there will be enlarged to handle production activities in the Panhandle with **L. W. Reynolds** as field superintendent and **G. E. Crosby** as field engineer. The district exploration office at Wichita Falls will be closed, and a geological subarea office with **W. L. Ammon** as geologist and **John A. Atkinson** as landman will be maintained there.

Bert Sager, drilling superintendent for Brinkerhoff Drilling Co. as Casper, Wyo., has returned to the job after a year's absence.

Oscar Keesee, geophysical and land scout for Superior Oil Co., at Oklahoma City, has been transferred to Calgary, Alta., Canada, for a short assignment.

John W. Anderson, scout at Los Angeles for Humble Oil & Refining Co., has been transferred to the Midland, Tex., staff in the same capacity. **R. F. Matthews** has also joined the Midland scout department.

Rudy Wadlington, former engineer with the Railroad Commission of Texas' Midland office, has joined the engineering staff of El Paso Natural Gas Co. at Midland.

Cameron L. Cox, intermediate petroleum engineer for Sinclair Oil & Gas Co. at Lindsay, Okla., has been transferred to Pharr, Tex., in the same capacity. Other transfers include: **Richard M. Kobdish,** division engineer at Casper, Wyo., to Tulsa as staff engineer in the general production office; **Stephen F. DeVore,** senior petroleum engineer at Kiefer, Okla., to Casper as division engineer; **Wyatt L. Sisson,** assistant district foreman at Gainesville, Tex., to Kiefer as district foreman; **E. J. Stephens,** roustabout at Arp, Tex., to Gainesville as assistant district foreman; **Franklin A. Dillard,** district foreman at Bonita, Tex., to Wewoka, Okla.; and **Raymond L. Losure,** intermediate petroleum engineer at Arp to Bonita as assistant district foreman.

J. W. Alix, assistant superintendent for Northern Natural Gas Co. at Sublette, Kans., has been transferred to Holcomb, Kans., as superintendent. **Merlin J. Esslinger** succeeds Alix as assistant superintendent at Sublette.

J. M. CRAWFORD

L. E. WHITEHEAD

John M. Crawford, former superintendent of the gravity division, geophysical department, of Continental Oil Co. at Ponca City, Okla., has been transferred to the development and research department where he heads the newly organized geophysical research division. **L. E. Whitehead,** formerly superintendent of the seismic division, has been named superintendent of the gravity and seismic divisions. The research and development division of the geophysical department has been renamed the equipment division, under the supervision of **Frank Searcy,** superintendent, and **R. F. Hughes,** assistant superintendent.

D. R. Droemer, division mechanical engineer for Shell Oil Co., has been transferred from Houston to Corpus Christi in the same capacity. Other transfers include: **F. Falcon,** district exploitation engineer at Midland, Tex., to the regional staff at Houston as geologist; **A. M. McLachlin,** exploitation engineer in the Houston area, to the regional staff; and **H. K. McKinnon,** district superintendent in the Midland area, to the Houston regional staff as exploitation engineer

Robert Stewart Bruns, Jr., has been elected a vice president of Transcontinental Gas Pipe Line Corp. in charge of all phases of the corporation's eastern operations. Prior to joining Transcontinental last year, Bruns had served in an executive capacity with Preferred Utilities Manufacturing Co. on the design and development of oil and gas-fired generating equipment. At Transcontinental, he has been in charge of contract and customer relations in the New York area.

F. T. Connolly has been transferred from the Houston geological staff of Shell Oil Co., to the geological staff in Oklahoma City.

John A. Weideman, production and drilling engineer for Gulf Oil Corp. at Penwell, Tex., has been transferred to Goldsmith, Tex., in the same capacity.

Dwight B. Sprow has been named superintendent of operations for Natural Gas Pipeline Co. of America and Texoma Natural Gas Co., succeeding the late R. T. Powers.

Lester H. Johnson has been named division seismologist at Midland, Tex., for Honolulu Oil Corp., succeeding **John W. Daly,** who has joined General Geophysical Co. as supervisor of the West Texas district with headquarters at Midland.

Alex McCoy, regional research geologist for Phillips Petroleum Co., has resigned but has not announced future plans. He will remain in Denver.

Emil J. Senne of Baldwin, N. Y., who retired in 1939 after 48 years with Socony-Vacuum Oil Co., Inc., received a certificate of merit from the American Petroleum Institute in Chicago for his efforts in accident prevention in Socony-Vacuum and

XUM

PERSONALS

throughout the oil industry. He assisted in founding the National Safety Council in 1913.

Joseph G. Lambert, formerly petroleum engineer with Stanolind Oil & Gas Co. at Cody, Wyo., has joined the Chase National Bank of New York to evaluate oil properties.

DR. MUSKAT

Dr. Morris Muskat, formerly director of the physics division of Gulf Research & Development Co., has been transferred to the general office of Gulf Oil Corp.'s production department where he will be technical assistant to **K. C. Heald,** vice president. Dr. Muskat joined Gulf's research organization in 1929 after receiving his Ph.D. degree from the California Institute of Technology. **Dr. Frank Morgan,** who has been with Gulf Research & Development Co. since 1936, was named director of the physics division succeeding Dr. Muskat, and **Dr. Norman D. Coggeshall** has been named assistant director.

Dean C. Wellman, geologist in Shell Oil Co.'s Denver office, has resigned to open Rocky Mountain area offices for Derby Oil Co. of Wichita. He was formerly associated with Pure Oil Co. for 7 years prior to joining Shell's geological staff 6 years ago.

E. F. Cole, rotary driller for Humble Oil & Refining Co. at Monahans, Tex., has been transferred to Snyder, Tex., as tool pusher.

Miller Quarles, Jr., district supervisor for United Geophysical Co. at Dallas, has been transferred to Houston in the same capacity.

John R. Fanshawe, Seaboard Oil Co., has been elected president of the Wyoming Geological Association at Casper. Other officers include: **John Miller,** Pacific Western Oil Co., first vice president; **F. A. Thurman,** Pure Oil Co., second vice president; **Helen Mann,** Continental Oil Co., secretary; and **M. D. Hubley,** Stanolind Oil & Gas Co., treasurer.

Kenneth Webb and **Ray Reston** have been transferred from the Wichita division of Deep Rock Oil Corp. to the new offices at Sterling, Colo. Webb will be in charge of exploratory activities and Reston will scout the area.

Billy E. New, tool pusher for Parker Drilling Co., has been transferred from Roswell, N. M., to Seagraves, Tex., in the same capacity.

A. B. Kerby, Jr., superintendent for Texas Engineering Construction Co. at Leighton, Ala., has been transferred to Corpus Christi in the same capacity.

R. Clay Underwood, independent oil operator of Wichita Falls, Tex., and formerly head of North Texas Oil and Gas Association, was named vice president of the North Texas district, a new area for Texas Mid-Continent Oil & Gas Association.

Jay E. Crane, a member of the board of directors of Standard Oil Co. (N. J.), has been elected a vice president of the company. Crane's election followed the retirement of **R. T. Haslam,** a director and vice president. Crane joined Esso in 1935 as assistant treasurer, was elected a member of the directors in 1944, and a member of the executive committee in 1949.

Thomas W. Pew of Houston, president of General Crude Oil Co., has been elected to the board of trustees of Cornell University, and will serve until 1955.

Charles Morganthaler has been appointed manager of the West Texas-New Mexico district for Associated Engineers, Inc.

G. B. Weller, field engineer for Ford, Bacon & Davis Construction Corp., has been transferred from Fond du Lac, Wis., to Columbus, Ga., in the same capacity.

Bert Aiguier, tool pusher for Danciger Oil & Refining Co., has been transferred from Jennings to Rayne, La., in the same capacity.

M. E. Mitchell, Jr., district petroleum engineer for Humble Oil & Refining Co. at Encino, Tex., has been transferred to Vernon, Tex., in the same capacity.

Clarence W. Hughes has been appointed Denver Basin scout for Carter Oil Co., working out of the Denver office.

James T. Foster has been named manager of the central division of Richfield Oil Corp. of California. He was formerly assistant division manager in Los Angeles.

W. S. Kotch, manager of the Little Rock, Ark., district for Magnolia Petroleum Co., has been transferred to the Fort Worth office as district manager, to succeed **C. W. Wofford,** who will retire the first of the year.

J. R. Maxey, formerly chief geophysicist for Deep Rock Oil Corp., has entered the consulting business in Tulsa, specializing in review and evaluation of seismic and geological prospects. He formerly was connected with Humble Oil & Refining Co., Carter Oil Co., Sohio Petroleum Co., and United Geophysical Co. He holds a master of science degree from the University of Oklahoma.

Jose Martorano, chief of the National Petroleum Bureau of Venezuela, and **Eduardo Acosta,** head of the reservoir-engineering division of the bureau, officially represented their nation at the meeting of the Texas Independent Producers and Royalty Owners Association and the hearings of the Texas Railroad Commission held last week in San Antonio and Austin respectively.

DEATHS

Thomas White, 81, retired oil producer, died in New York City October 16. He was born in Emporium, Pa., and is credited with oil discoveries in Louisiana, Texas, Kentucky, Oklahoma, and Kansas.

Louis L. Marcell, 72, founder of White Eagle Oil & Refining Co., died October 21 in Kansas City, Kans. The company later became the White Eagle division of the Socony-Vacuum Co. and Marcell was general manager of the division until his retirement in 1943.

P. G. Reynolds, 61, former Wichita independent oil operator, died October 13 in Gunnison, Colo.

Allen W. Stubblefield, 59, veteran Skelly Oil Co. employe, died October 20 in Tulsa. He had been with the firm 28 years until his retirement in 1947.

Joseph Quinlan Dobbins, 54, production clerk for Humble Oil & Refining Co., Loleta, Tex., died October 17 in Ardmore, Okla.

Thomas Boyd Jaudon, 48, chief auditor for Gas Service Co., died October 3 at Branson, Mo.

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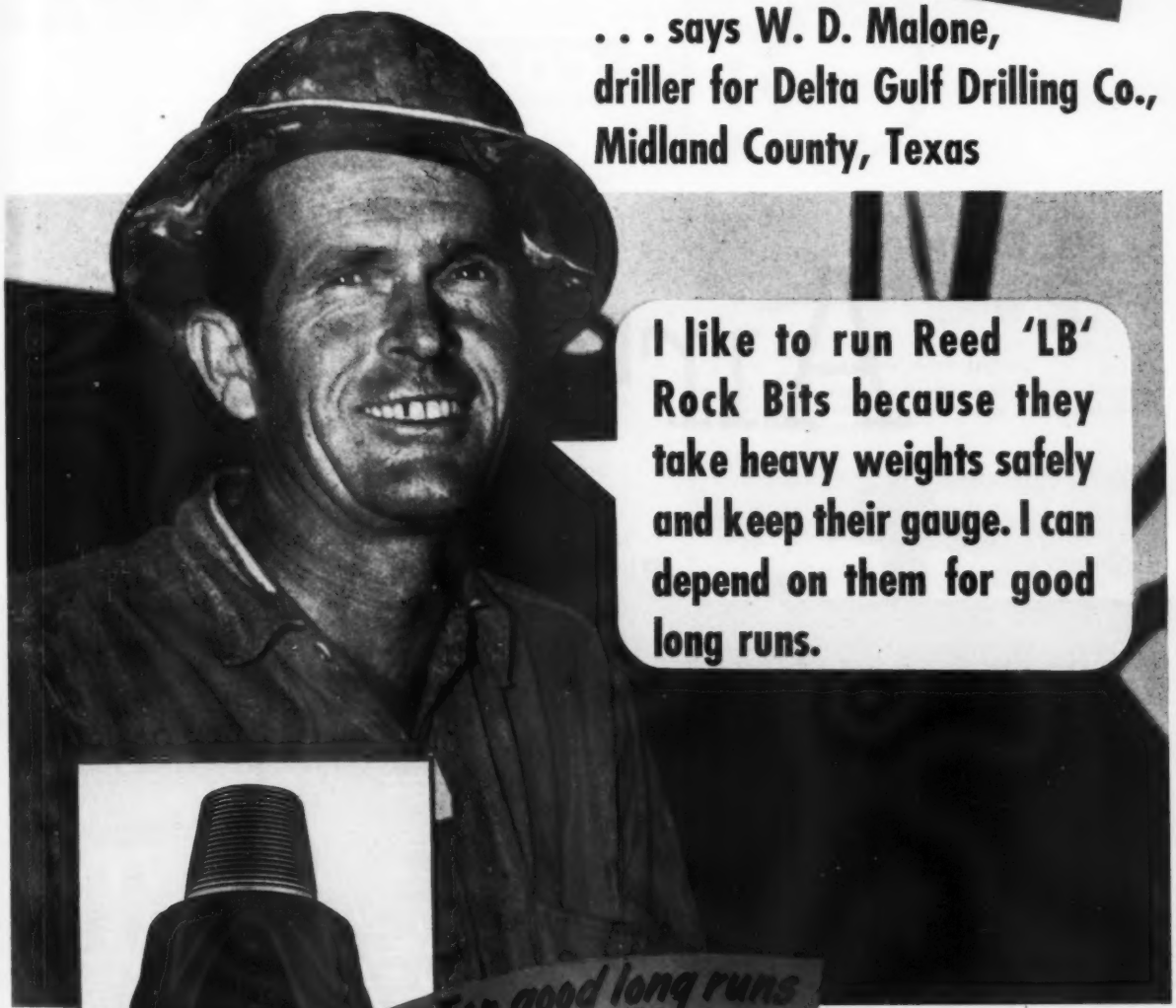
. . . says W. D. Malone, driller for Delta Gulf Drilling Co., Midland County, Texas



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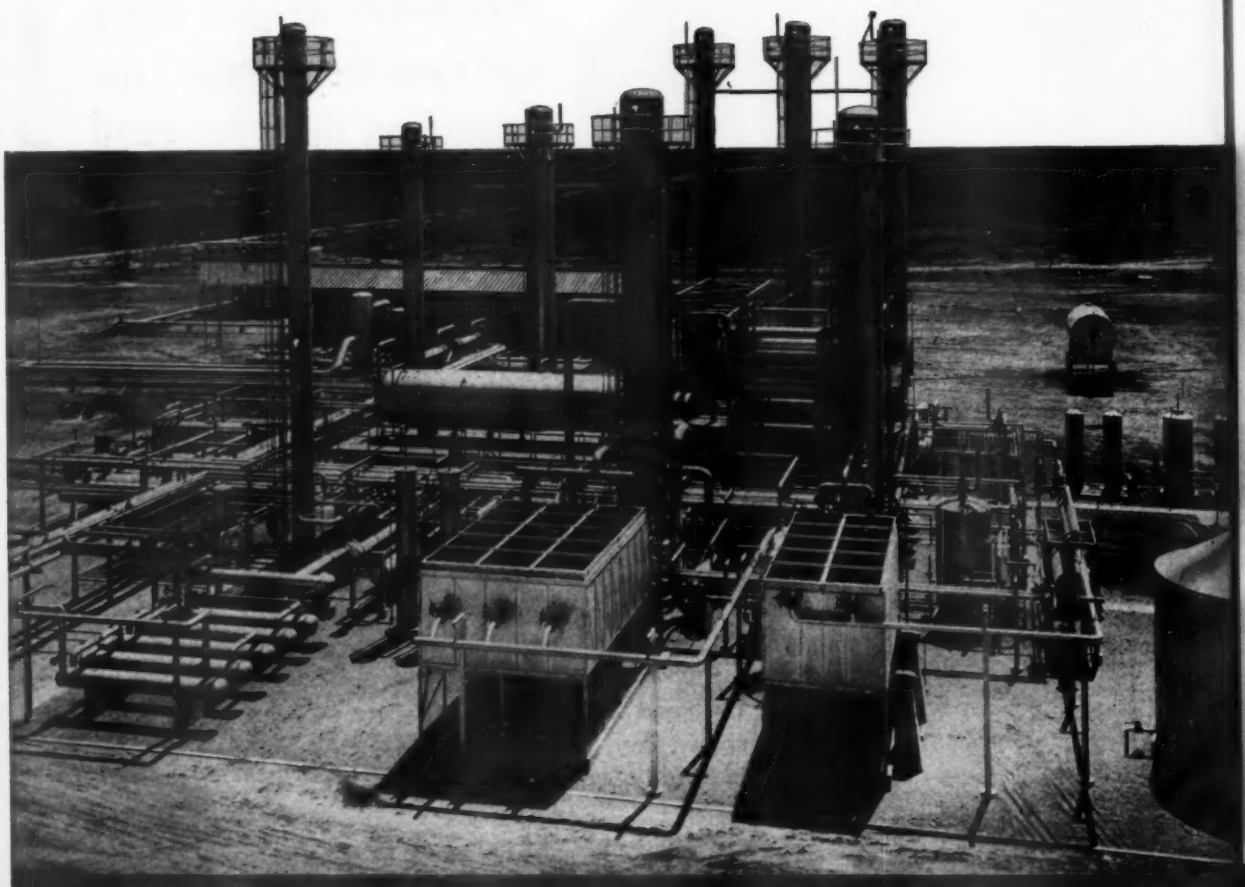

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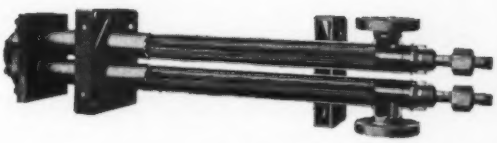

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At the recent dedication ceremonies of Pan-Am Southern Corp.'s new 9,300-bbl. per day coking unit at El Dorado, Ark., Bruce K. Brown, the firm's president, explained that formerly the refinery's residual fuel stocks had been troublesomely high, due to railroad dieselization; on the other hand, orders for diesel oils were increasing. Brown explained, "After our survey, it was decided to expand facilities to produce more gasoline and diesel fuel, at the expense of residual-fuel production, and at the same time make petroleum coke, a readily salable product. It usually takes 18 months to build a 400-ton coking unit, such as we have, but ours required less than a year."

Newly Dedicated Pan-Am Southern

Delayed-Coking Unit Charges 9,300 Bbl. Daily

Arkansas plant incorporates new design developments

by Oscar A. Fuchs*

ON August 30, 1950, a new delayed-coking unit, employing hydraulic decoking, started operation at the El Dorado, Ark., refinery of Pan-Am Southern Corp. This unit is designed to charge 9,300 bbl. per stream day of 13° A.P.I. reduced crude and to produce 1,950 bbl. per stream day of C_4-400° e.p. gasoline, 5,240 bbl. per stream day of gas oil for cat cracking charge, and 420 tons per day of coke.

Several design features mark the plant as an example of the latest developments in delayed coking units. Two large coke drums 17 ft. 6 in. in diameter and 96 ft. 5 in. from flange to flange are included in the coke-producing facilities. It is believed that these are the largest coke drums which have been placed in operation in delayed-coking units.

A unique coke-handling system channels the falling coke to a dewatering basin below the drums. Decoking water drains from the basin, and a dragline scraper transfers the coke to an adjacent storage pile. A simplified plot plan illustrating the coke handling system is shown in Fig. 1.

To support the hydraulic decoking piping, structural steel projects 234 ft. above ground level. Representative of recent developments in instrumentation, a graphic panel control board indicates the process flow and control points at a glance.

The unit design is based on charging 9,300 bbl. per stream day of reduced crude derived from topping a mixture of Arkansas and North Louisiana crudes of 34° A.P.I. The crude is reduced to about 30 per cent bottoms to make up a coking-unit charge of 13° A.P.I., 3 per cent sulfur, and 15 per cent Conradson carbon. At the design rate, the expected product rates (bbl. per stream day) are 1,950 of C_4-400° e.p. gasoline and 5,240 of 25° A.P.I. 0.3 per cent Conradson carbon gas oil. Coke is expected to be produced at 423 tons per day, design rate. These expected yields are shown in Table 1.

Oil flow through the unit is straightforward and similar to the flow in other delayed cokers operating in the nation. A simplified flow diagram is shown in Fig. 2.

Fresh feed is charged to the unit directly from crude-topping facilities at about 650° F. From a feed surge drum at the unit, the hot oil enters a combination tower where hot vapors from the coke drums strip light virgin gas oil from the feed; the heavy feed plus a heavy gas oil recycle accumulates in the bottom of the tower. From the tower bottom, oil of about 12.6° A.P.I. is charged through two parallel coking coils at total design rate of 10,475 bbl. per stream day.

TABLE 1—EXPECTED YIELDS

Product—	B/SD	Vol. %	Wt. %
Charge	9,300	100.0	100.0
Gas, C_3 and lighter	....	....	5.1
Gasoline, 100 per cent C_4	1,950	21.5	16.1
Gas oil, 900° F. and 90 per cent	5,240	56.7	52.2
Coke	....	....	26.6
Coke, tons per day	....	....	423

The coking furnace is designed for heating the oil rapidly to the coking temperature without coking the tubes, and hence oil flow is through the radiant section only. Design furnace pressure drop is 100 psi. with an inlet pressure of 140 psig., and outlet pressure of 40 psig. Design coil outlet temperature is 920° F.

From the furnace, the outlet streams combine and flow through a master switch valve which directs the flow through similar switch valves to one or the other of the coke drums. The hot oil, calculated to be 65 per cent vapor, enters the bottom of the drum where the liquid reacts to form coke and the vapors flow through the drum at a velocity of about 0.27 ft. per second. Porous coke believed to average about 50 per cent gradually forms a bed extending from the bottom upward. Oil and vapors must percolate through this bed and consequently near the end of a filling cycle the inlet pressure increases about 10 psi. At design conditions, the drums will fill with 423 tons of coke in 24 hours. The drums are so sized that this coke vol-

*Area supervisor (coking) Pan-Am Southern Corp., El Dorado, Ark.

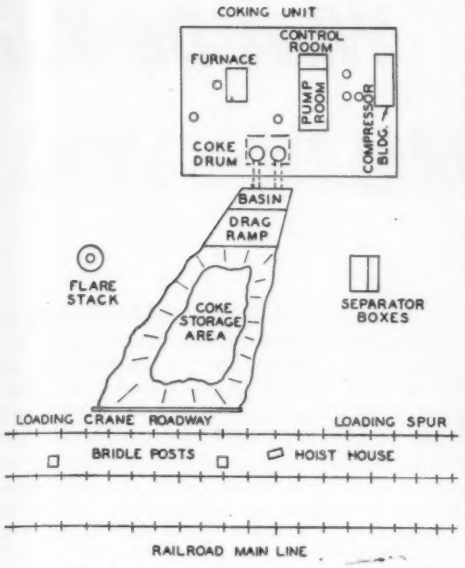


Fig. 1—Plan layout of the new delayed coker at Pan-Am Southern Corp.'s El Dorado refinery.

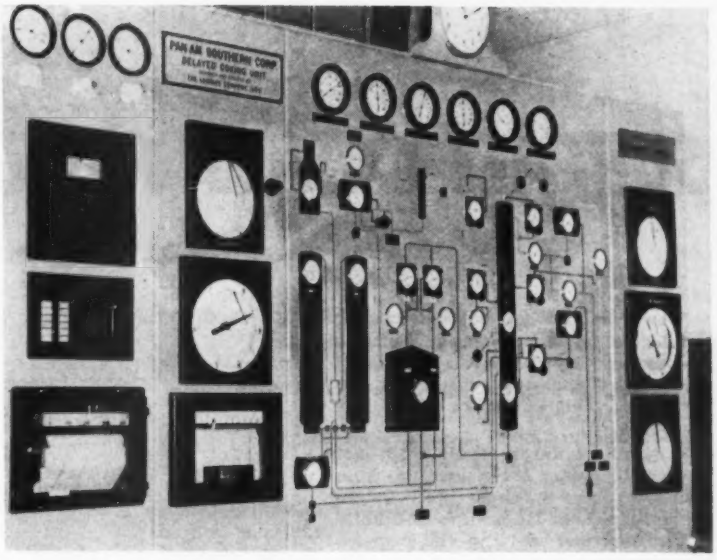


Fig. 3—A portion of the control board for the delayed coking unit. Recorders supply reference data on plants' operations.

ume will rise to a height of 63 ft. on the straight sides to leave an outage of approximately 14 ft.

Vapors from the coke drums flow to the combination bubble tower where they are fractionated into gas oil and gasoline plus wet gas. Tower heat balance is maintained by a circulating gas oil stream which generates steam in a gas oil to boiler feed water exchanger.

Vapors from the bubble tower flow to a distillate-wet gas separator drum designed to operate at 8 psig. Wet gas is compressed to 65 psig. and recontacted with the distillate. The gas plus distillate are cooled and flashed at about 62 psig. The gas then flows through two packed absorber columns in series where 90 per cent of the butanes and 35 per cent of the propanes are recovered. C_3 and lighter dry gas flow to the refinery fuel-gas system. The flashed distillate is pumped to a debutanizer column operating at 155 psig. where a debutanized bottoms gasoline of about 5 lb. R.v.p. and a C_3-C_4 liquid overhead stream is being produced. The debutanized gasoline passes to storage while the C_3-C_4 stream is deethanized and charged to a poly plant.

Pump room and control room.— Relatively mild winter temperatures permitted construction of a pump room open to the weather on three sides. The control-room building, adjoining the north end of the pump room, constitutes one protective wall. Above the pump-room roof, at the south end, steel structure supports the bubble-tower overhead condensers, two barometric steam-jet vacuum condensers, and a vertical gas-oil steam generator. Beneath this steel structure on the roof proper are located the gas-plus-distillate separator drum and the steam-generator drum.

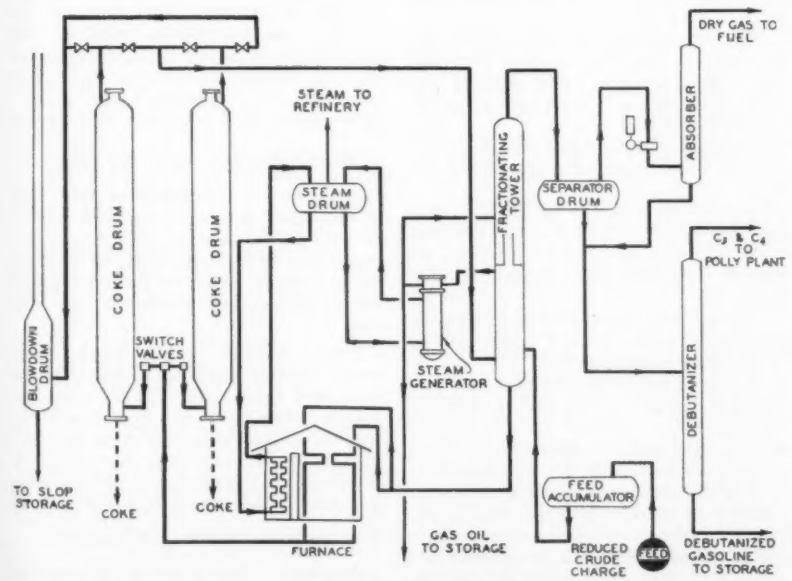


Fig. 2—Flow scheme of the new 9,300-bbl. per day delayed coking plant now in operation at the El Dorado, Ark., refinery of Pan-Am Southern Corp.

Instrumentation. — An outstanding feature of the unit instrumentation is a graphic panel control board for the coking section proper. The graphic panel instruments are mounted on a portion of the board measuring 6 ft. 6 in. long by 7 ft. 6 in. high. Instruments in the graphic section are indicators and controllers. Circular chart and strip chart recorders are located on each side of the graphic flow picture. An illustration of the control panel is shown in Fig. 3.

An advantage of the graphic panel is the large number of process variables displayed in a small board area. Dial indicators 3 in. in diameter show levels, temperatures, pressures, and flows. Pneumatic controllers mounted behind indicating dials of controlled points provide convenient control point reset and automatic to manual switch at the control board.

To speed the response of the furnace temperature controller and the gas-oil chimney vapor structure controller, special "derivative" units were installed in the controller air circuit. These units amplify any deviation from the controlled point and thus speed up the control-valve action to correct the deviation before it has reached appreciable magnitude.

Coke drums. — Two large vertical

(Continued on page 107)

XUM

What Do You K

SURFACE-CASING FAILURES?

by B. B. Smith

IN recognition of the increasing amount of surface-casing failures encountered by the drilling industry, the author analyzes possible causes of failure, and points to preventive measures.

Most top failures result from not having the rotary table lined up, from failure to have a rubber protector on the kelly sub, or from a crooked kelly joint. Improper welding and cementing practices also contribute to failure of surface casings.

A better understanding between the operator and the drilling contractor when trouble is encountered in surface casing is urged. Future trouble and even the loss of a hole may be avoided, if the trouble is taken care of when it is first noticed.

B. B. Smith is vice president and manager of operations for Loffland Brothers Co., Tulsa. He has been active in the oil and gas industry for over 30 years. Smith was associated with Meade Brothers of Tulsa, also with J. E. Mabee and Arrow Drilling Co. He became associated with Loffland Brothers Co. in 1933, and looked after tools in Oklahoma, South Texas, and Louisiana. He was transferred to California in 1938, and from California to New Iberia, La., as drilling superintendent over Louisiana, Mississippi, and Florida districts. In 1946 he was advanced to vice president and transferred to Houston as manager of Gulf Coast division; was transferred to Tulsa in 1949 and made manager of operations.

WHAT IS THE PROBLEM? . . . .

Answer.—The drilling contractor in the past few years has encountered an increasing amount of trouble with the failure of surface casing during the drilling of a well.

It may be that the increase in total number of rigs running has made this problem appear to be more frequent, although there may not be any increase percentagewise to the number of wells drilled.

The increase, if any, is probably attributable to the fact that the shortage of casing has resulted in the use of a considerable amount of inferior surface pipe. This can be either second-hand pipe or pipe that is not the same weight, grade, or type normally used.

It has always been recognized as a fact that any surface-casing failure has been the responsibility of the operator, unless that failure is a result of negligence on the part of the drilling contractor. As a general rule, it is agreed that failures at the top of the string are more apt to be the responsibility of the contractor, while failures at the bottom of the surface casing are seldom affected by the contractor's method of operating.

How are top failures caused? . . . .

Answers.—Most top failures are a result of not having the rotary table lined up, or failure to have a rubber protector on the kelly sub, or a crooked kelly joint. The result of such practice would be the top joints being worn thin, or a hole being worn through the pipe in the top 45 ft., or a loosening and resultant failure of the top joints.

We all know that a hole started straight and kept straight will reduce the possibility of surface-casing failures; therefore it is evident that the proper way to start a hole is to be sure that the rig is properly lined up and that all equipment is in its proper condition.

In keeping the hole straight in some areas the proper procedure is to drill a small hole, taking surveys at intervals of from 100 ft. to but never to exceed 250 ft. The small hole will then be reamed out to the proper size with a pilot bit.

It is not good practice to use a flat-bottom bit, due to the fact that this type has a tendency to sidetrack the hole if a bridge is encountered while reaming down.

A check survey should always be run at the bottom of the reamed-out hole.

Another practice is to drill a regular-size hole; this is in areas where holes are easier to keep straight, or where smaller-size surface casing is set.

The rathole and reaming practice is generally used where 10¾-in. or larger size pipe is set.

It is good practice to measure the surface casing on the casing rack at the time the surface hole is being made, in order to know the exact amount of hole that is required.

It is not good practice to make too much hole and swing the casing too far off bottom. In this connection a lot of attention should be paid to the formation that the casing will set in.

In wildcat areas the surface casing should be bottomed in lime or shale.

If it is discovered that the amount of casing on hand requires a hole that will set the casing in sand, the contractor and the operator should get together and agree to drill on down until a more solid formation is encountered.

What about use of centralizers? . . . .

Answer.—In my opinion it should be regular practice for all operators to run centralizers on their surface casing, to insure centering of the pipe in the hole in order that the cement can get all around the casing for at least 100 ft. or more from bottom. Almost all operators are running centralizers on their long strings of casing but very few use them on their surface casing. To me, it is just as essential to run centralizers on surface casing as it is on the long string.

Where should "shoes" be used? . . . .

Answer.—A combination float and guide shoe should be on the bottom of the casing, and an additional float valve should be used from 45 to 60 ft. off bottom in order to keep all possible contaminated cement in the casing.

Some trouble results when operators depend only on a combination float and guide shoe. Then when the plug is pumped down all the contaminated cement is left around the bottom joints of the casing instead of up inside the casing, as would be the case when an additional float valve is used.

Is welding worth the trouble? . . . .

Answer.—The welding of surface casing is a very important factor. The

(Continued on page 80)

Know About DRILL-COLLAR FAILURES?

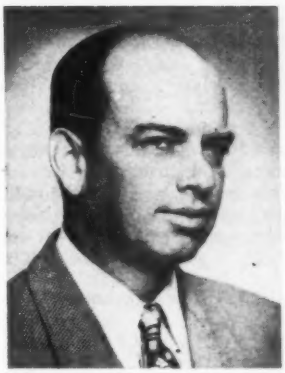
by Stanley C. Moore

PRACTICALLY all drill-collar failures are the result of fatigue at the connections. Prevention of such failures is a basically simple problem if their causes are understood.

Box failures are usually the result of corrosion fatigue and can be prevented simply by protection against corrosion.

Pin failures are the result of certain poor operating practices which cause overstressing. Most pin failures can be avoided if a few extremes in operating practice are recognized and eliminated.

A simple set of rules is presented in the concluding statement of this discussion.



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Both this and the article starting on the opposite page, were papers presented at the tenth annual meeting of the American Association of Oilwell Drilling Contractors, Tulsa, October 9, 1950.

WHAT IS THE PROBLEM? . . . .

Answer.—Practically all drill-collar failures noted in the field are the result of fatigue at the connections—either simple fatigue in the case of the pins, or corrosion fatigue in the case of the boxes. If these fatigue-type failures can be prevented at reasonable cost, then drill-collar problems would be largely solved.

What can be determined from fatigue studies? . . . .

Answer.—In engineering practice, fatigue studies are usually made with a graph known as the "S-N Curve." We can use it to advantage here to help us get at the fundamentals of the problem.

Fig. 1 is a "S-N Curve," with the stress (or measure of the operating load) plotted vertically. The length of service in millions of revolutions is plotted longitudinally.

To give the graph some relative value, we have indicated that the average Scurry County well requires 2½ million revolutions to drill. Further, as an example, we show how constant operation at a stress level only 10 per cent above the safe range can cause failure at very short life, say two wells. Failure occurs when the operating stress line crosses the "strength line."

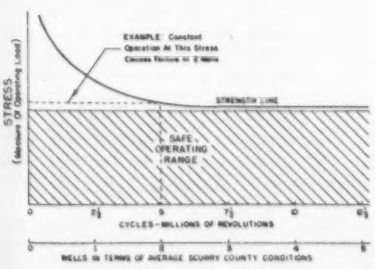

Fig. 1—"S-N Curve."

Analysis of data in Fig. 1.—The line which represents failure is called the "strength line." The stronger the drill-collar joints are in resisting fatigue, the higher this line is. Note how the line straightens out toward the right and gets no lower.

If operating stresses could always be kept low enough, the joint never would fail. Naturally, you think that's not practical—but before we finish here, I hope to leave with you the impression that you can achieve remarkably long life for drill-collar connections without a sacrifice in drilling rates and, in particular, that 5 hours' operating may sometimes do more damage than 500.

Corrosion also important.—A factor, to be considered here in detail, and which knocks the whole strength line into a cocked hat, is corrosion. With corrosion present, there is no true strength, and, therefore, no safe operating range which will insure you permanently against failure. Such failures are apparently limited to boxes, where the critically stressed thread roots are exposed to corrosion.

Fig. 2 illustrates such a failure. Note how a crack has progressed from the heavily corroded thread roots outward. Such failures are the greatest drill-collar problem in areas where corrosion-fatigue troubles are common with drill pipe. In other areas such box failures are no problem at all.

How about care in handling? . . . .

Answer.—One might think that a paper on "Causes and Prevention of Drill-Collar Failures" should give considerable attention to the matter of care in handling. However, much has already been written on this subject and generally the care used in handling is adequate to the extent that this factor is rarely the cause of failure. Therefore, since our object is to tell you what you can do to prevent failures, we will overlook this phase and get down to the real causes of failures.

Here's an example.—In the making up of drill collars, everyone has always seemed concerned with whether they should be spun up with a chain, walked in with hand tongs, or rotated in with the rotary. In my opinion, what is 100 times more important is that final punch, that last jerk of the tong line—just how tight they were finally made up. I think I'm safe in saying that improper makeup

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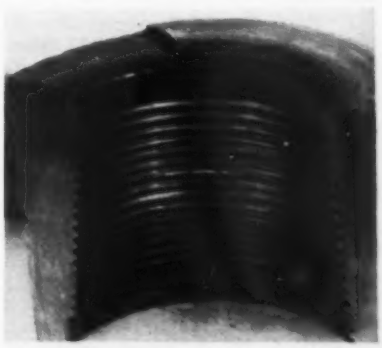

Fig. 2—Typical corrosion-fatigue failure.

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Surface-Casing Failures

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casing should be made up tight, then spot welded in about four places of about 1½ in. in length around the top and bottom of the collar and floats.

I believe it is bad practice to weld the pipe all the way around unless slip-joint casing is being used; then of course it is essential to weld it all the way around, but then only with the proper kind of rod and proper amount of heat as recommended by the manufacturer of the casing.

In many instances when threaded and coupled surface casing is welded in the field, the work is done by any oil-field welder who is close by. He may never have had experience in welding casing and may not know any better than to weld the collars and floats all the way around. He may not know the proper size rod or the proper amount of heat to apply to the rod. Consequently the steel structure of the casing is broken down at the bottom of the weld, to the exent that it takes very little vibration to break the casing off. In summary, if for any reason the casing loosens up at the bottom of the string, the shoe or any one of the welded joints may break off, and your trouble starts when the casing drops down.

How much cement should be used?

Answer. — Particular attention should be given as to the proper amount of cement used in cementing surface casing. The operators that have the least trouble are the ones that use a sufficient amount of cement to cement the casing from bottom to the top of the string.

The operator should figure the proper amount of cement it will take to fill the hole on the outside of the casing, then add a sufficient amount to take care of any possible cavities. Then after the plug is pumped down and let set a few hours, additional cement should be put in around the top, either by dumping the proper amount in or by running small pipe down beside the casing, then pumping in enough to finish filling around the casing.

In some cases cement returns are noticed long before the plug is down. When this happens it is generally because the plug is pumped too slow, and the cement has channeled. It is good practice to use as much volume as possible to pump the plug down in order to raise the full column of fluid around the outside of the casing in order to avoid this channeling.

Another reason surface casing should be cemented to the top is that in all areas everyone is becoming more blowout-preventer conscious, and demanding the heavier blowout preventers be properly anchored. When casing is left loose at the top it is impossible to anchor the preventers to where they will not vibrate and shake loose.

What is best practice in drilling cement plug? . . . .

Answer.—The proper procedure in drilling the plug in surface casing is to use a rock bit. A blade bit or drag bit has a tendency to hang up and may loosen the casing, or could possibly back the casing off.

Particular attention should be paid to the rubber protectors used on the drill pipe. The proper number of rubbers should be used, one on each and every joint, and the rubbers should be kept larger than the tool joints.

Any time a rubber is let run out of the bottom of the surface casing into the formation, it is worn out in one trip. In this case the rubber should be changed and at all times a rubber of the proper size should be kept on the kelly sub.

Suppose trouble or a failure is encountered? . . . .

Answer.—There should be a better understanding between the operator and the drilling contractor when trouble is encountered with surface casing. At the least suspicion, an electric log should be run to determine if the casing is parted. Then the loose joint should be cemented.

In some instances a joint of surface casing has been known to fall a thousand feet and the hole finally lost, when it could have been avoided had it been taken care of when it was first noticed.

There is a lot of money spent due to the lack of understanding between the men in charge of the company operations and the tool pushers in charge of the drilling contractor's tools. Sometimes neither representative is sure where the responsibility for the trouble lies. Therefore, no one is taking the direct responsibility immediately, and therefore valuable rig time and other expensive undertakings are going forward without any planning.

HOW CAN ALL THIS BE SUMMED UP? . . . .

Concluding statement . . . .

When the drilling contractor makes the amount of hole specified by the operator. . . .

And runs the casing furnished by the operator in the manner specified by him. . . .

Cements the casing according to the operator's specifications. . . .

Anchors the blowout preventer sufficiently. . . .

Drills the plug with a rock bit. . . .

Runs the proper number of right-size rubber protectors on his drill pipe and kelly sub. . . .

He will avoid much surface-casing trouble.

Drill-Collar Failures

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torque causes 100 times more failures than any other single factor in the handling of drill collars above the ground.

Basically, there is only one problem in prevention of fatigue failures—that is merely to prevent the operating stress line from crossing the strength line (see Fig. 1). To accomplish this, we have three things to do. **First,** keep the strength line up; **second,** keep the stress down within the "safe operating range"; and **third,** eliminate the possibility of corrosion upsetting the balance we hope to achieve. Let us consider these three points separately.

1. Discussion of Strength Line

Strength of the drill collar, as originally manufactured, is determined by design and metallurgical processing. Limitations are sometimes imposed by contractors which make high design strength impossible. Most frequent of these limitations are (1) a large bore and (2) a reduced diameter at the top of the drill collar to facilitate fishing. Such limitations should be avoided wherever possible.

Principal problem of design is to select a size connection which will afford balanced strength of box and pin. Manufacturers have worked out constructive data for selection of joints, which should be very useful. However, it is very noticeable how this strength balance is ignored in corrosive areas, where box failures are prevalent. The tendency there is to make the box stronger, even though it means sacrificing strength in the pin. This seems an erroneous approach to the problem, as higher overall strength can be attained by using correct balance between box and pin, and additionally providing protection against the corrosion which causes the premature box failures.

Several manufacturers are furnishing modified types of boxes and pins, which provide additional strength through certain design features and processing. In each case, principal attention is given to the thread roots where practically all failures originate. Round bottom thread roots are used to reduce stress concentrations, and these roots have their surfaces cold worked to further increase the resistance to initiation of fatigue cracks. Such methods have produced a very marked reduction in pin failures. However, in the case of boxes, the same improvement has not been noted due to corrosion. More recently experimental results indicate that the anticipated improvement can be obtained with boxes if they are protected from corrosion.

Field machining.—Strength of the joints is often affected by errors in machining. In this connection, most efforts at control, especially in field

shops, have been directed to obtaining proper lead, taper, and gage standoff. In fact, except for a few rare instances, control of these elements of the threaded connections have been adequate.

There is still another element of the thread, however, which many field shops choose to overlook entirely, and which I consider to be the cause of more premature failures than all other machine-shop errors combined. This is the shape of the thread root. It is almost universal practice in field machine shops to grind lathe tools so they form sharp-cornered roots as shown in Fig. 3, even though

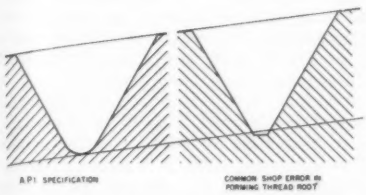

Fig. 3—Comparison of A.P.I. thread root with type commonly formed with lathe tools.

every specification shows the radii indicated. They are meticulous, as they should be, in controlling some elements to several thousandths of an inch, yet they choose to ignore a radius of 20 thousandths of an inch.

Sharp threads.—Any kind of a thread is bad enough as a stress concentrator, but sharp threads are much worse. Aside from hastening fatigue failures, sharp thread roots may cause cracks in pins when they are made up—perhaps before they see any service at all. This is especially true of small drill collars which are often made up with excess torque. Every pin stretches when it is made up and sharp roots sometimes rupture in the process. This explains some of the very early pin failures noted in small drill-collar connections.

2. Discussion of Safe Operating Range

Majority of operators apparently do not achieve maximum performance with their drill collars because of damage done to them by occasional high operating loads outside the safe operating range. Everything indicates that the average stresses imposed by usual daily operating practices are comparatively low. Thus, if the occasional sprees outside of bounds were eliminated, life of the joints could be extended several fold. A few operators have achieved this close control and have drilled as high as 20 wells in areas where 4 is the average. Control is the answer.

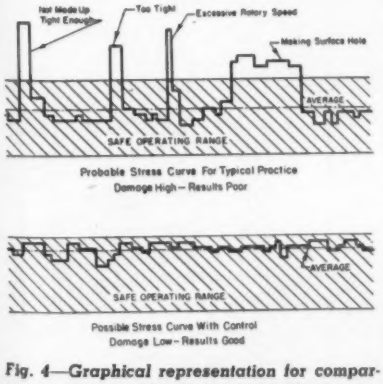

Fig. 4—Graphical representation for comparing stresses produced by typical practice with those produced by controlled practices.

Fig. 4 is a graphical illustration of such extremes of operating practices. There is definite proof that even short operating periods at stresses above the safe operating range are very damaging.

In 1938, for example, German investigators found that 5,000 revolutions at 50 per cent overload caused a 10 per cent loss of strength and that 25,000 revolutions at the same load caused a 30 per cent loss of strength. Drawing an oil-field parallel, this means that a driller who is behind in his hole and "crams it" for 4 hours by rotating at high speed may weaken the joints by one-third. Such permanent damage is not apparent at the time because failures may not occur until one or two wells later.

How serious is this "permanent damage?"....

Answer.—I just cannot overemphasize this permanent damage that can be done in a matter of an hour or two. Just consider the significance of the thing—as much life can be taken from the joints in one hour of abuse as in drilling an entire well with controlled practices. And there are things other than rotary speed which cause periods of overstress. We repeat, control is the answer.

Compare the two graphs in Fig. 4. Note that higher operating loads can be sustained if the extremes are avoided. This means, for example, if rotary speed affects rate of penetration, and it is found that 90 r.p.m. is the top of the safe range, that 85 r.p.m. could be maintained indefinitely.

On the other hand, if some driller had occasionally rotated 120 r.p.m., then the loss of strength would be such that even 60 r.p.m. would result in failure. Thus, controlled rotary speed would mean higher rates of penetration without trouble.

How can all this be summed up?...

Answers.—It is my opinion that most failures, not attributable to corrosion, could be eliminated if the extremes listed below were avoided:

1. **Excessive rotary speed.**—Although no rules to cover all areas can be advanced, it is believed that experience in each area will in time indicate a safe maximum speed. Generally, the approximations we now have for such speeds may be somewhat low because accurate enough controls have not been imposed to determine exactly what they should be.

What I mean is that 85 r.p.m. may be safe and 90 r.p.m. not safe, but with present methods if we established 85 r.p.m. as maximum we would sometimes be turning 90—so the impression is gained that 85 r.p.m. is unsafe. Possibly what is needed is an accurate speed control for the rotary table.

We do not know that anyone has produced a scientific explanation for the drastic increase in damage which small increases in rotary speed may bring about. It is probably that "critical speeds" exist which set up vibration in drill-collar strings, similar to the critical speeds developed in other rotating systems. The problem is so highly complicated, especially with the damping characteristics of the fluid and hole size involved, that it defies analysis.

2. **Makeup torque.**—It has long been known that inadequate torque causes failures of pins on both tool joints and drill collars. Only recently has it been observed that excessive torque also causes failures in pins. In fact, it now appears that most of the pin failures which have occurred to date could probably have been avoided had correct torque been used.

In common practice makeup torque varies greatly and it is a wonder results have been as good as they have. In one group of rigs, using the same size drill collars, the makeup torque was found to vary from 4,300 to 23,000 ft.-lb. The recommended torque was 28,000 ft.-lb.

At the other end of the scale, small collars, which should have been made up with 15,000 ft.-lb. torque, were failing very prematurely because too much torque had caused the pin to be permanently stretched, in some cases as much as 3/16 in. Such stretching causes rupture of sharp threads roots and failure follows quickly.

(At the time of this writing, the torque for developing maximum strength of the pins had not been fully determined, although at least one major tool company had scheduled an investigation of the matter. In any event, the recommended figures will be only an approximation due to the variability of friction. We already have a fair estimate of the upper and lower torque values which are definitely harmful, and at present the torque suggested is halfway between the two extremes.)

At least one tool has been developed for the specific purpose of controlling torque applied to drill collars on the derrick floor.

3. **Use of small drill collars in large hole.**—In the Scurry County area of West Texas a great number of failures have been attributable to the use of the small-hole drill collars for drilling of surface holes. An average

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Remotely Controlled Pipe-Line Stations

Automatic controls are justified, the author avers, by ease of operation, greater throughput, and more accurately controlled pressures than hand operation affords

by S. S. Smith*

THE simplest sort of a pipe-line station is the single unit pumping through a length of line whose hydraulics approximate the capacity of the pump. This kind of station can be operated with centrifugal, reciprocating, or geared-type pump. If the station is attended, about all the controls that are necessary are those required to start and stop operations.

If, instead of a single station, there are a number of stations on the line, the pump capacities in each station must be adjusted to equal the upstream and downstream line conditions; if they are not, the pumps either starve for suction pressure or exceed the capabilities of the downstream line or the pump itself. Thus, as soon as multiple stations are required, control becomes necessary.

*Shell Oil Co., Inc. Presented at A.P.I. Division of Transportation meeting, St. Louis.

In early pipe-line techniques, simple single-station lines were coupled together and pumped from station tank to station tank, and occasional adjustment of pump throughput served to match capacities between stations. As products lines came into being, and more specifically, multiple-product lines became the vogue, the advantages of automatic control became more apparent because with automatic control, throughput could be maintained higher and cleaner interfaces between adjacent products could be preserved.

For a number of years, product pipe lines have used automatic controls in greater or less degree. The simplest of such controls throttled the discharge of centrifugal pumps, operated bypasses of reciprocating pumps, or regulated the speed of variable-speed prime movers driving reciprocating pumps according to the suction pressure of the station. Usually in such stations, secondary or emergency shutdown facilities were provided to stop the pumps in case of excessive discharge pressures as a protection to the line and the motive-power equipment. This type of control was the first of the so-called tight line controls, and is believed to be originally used on the old Tuscarora products-line system.

In some cases, economic factors dictated the use of diesel or internal-combustion power units, and in the first of these operations the suction

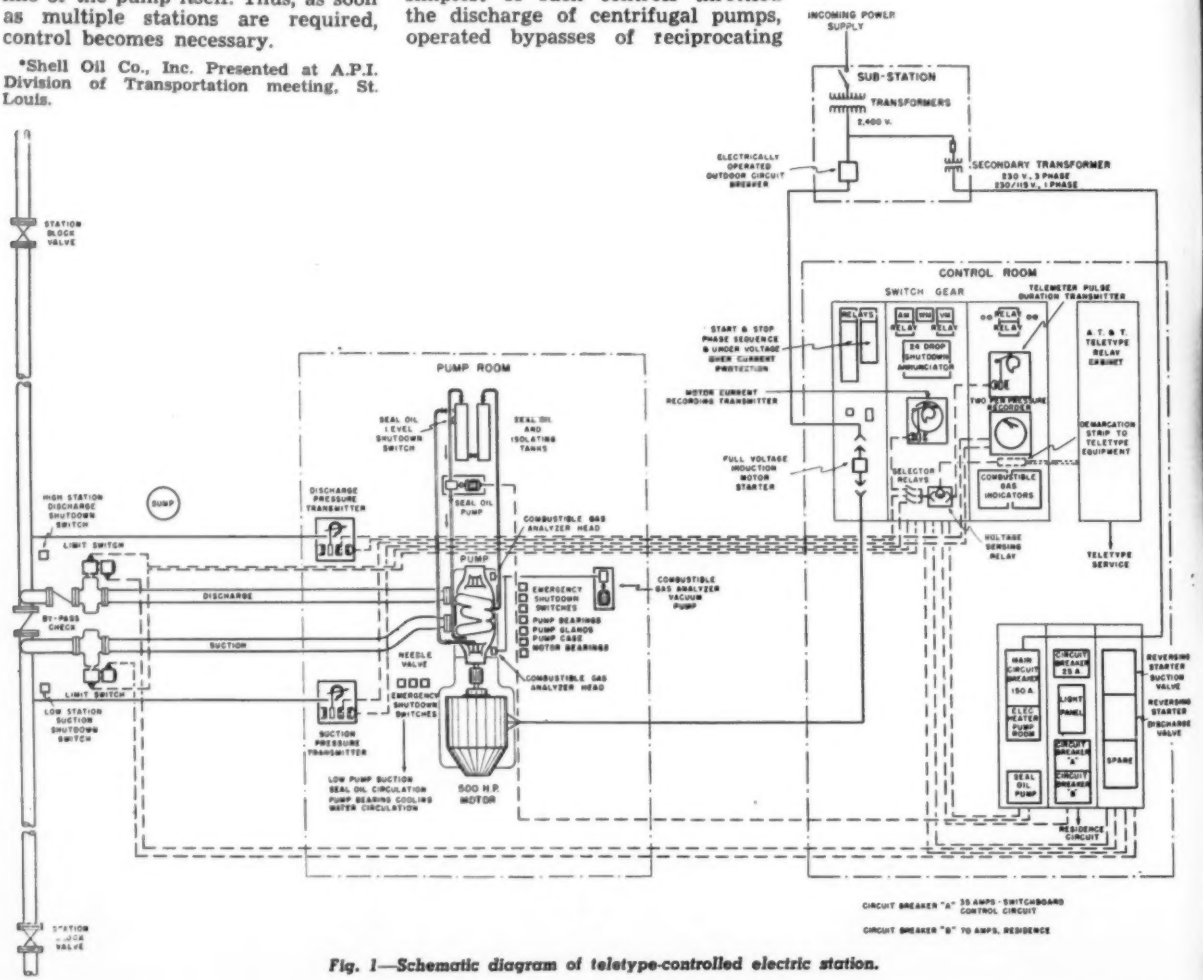

Fig. 1—Schematic diagram of teletype-controlled electric station.

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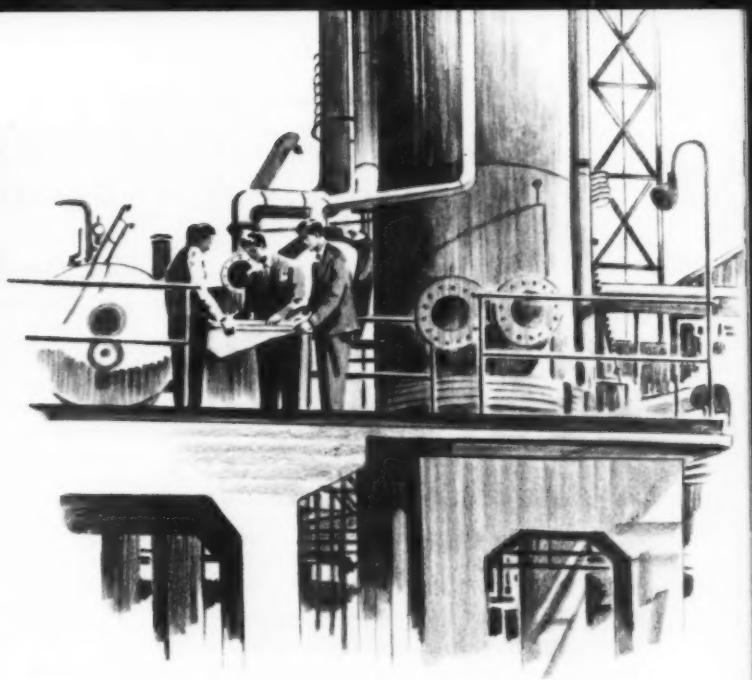

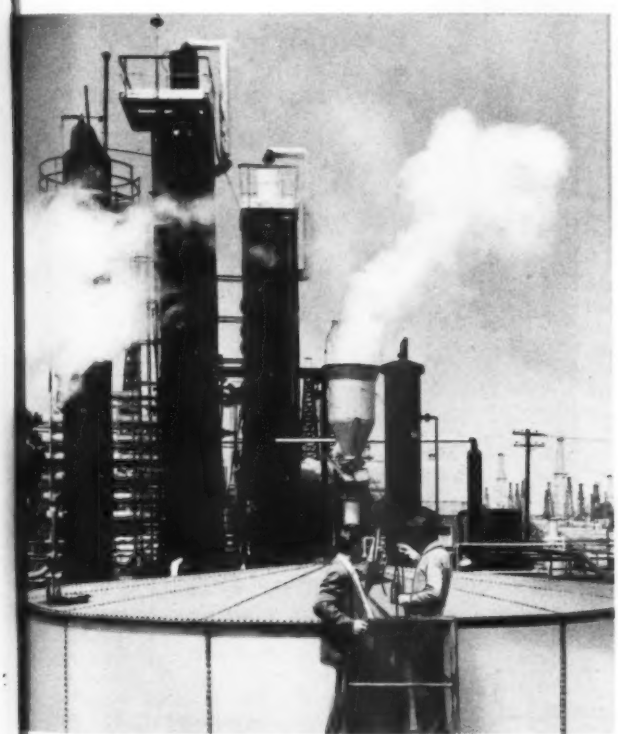

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pressure functionally controlled the speed of the prime mover, and in some cases the discharge pressure was also tied into the speed control. In these units, air instruments were tied into the governor speed control of the prime mover or were directly tied to the throttles of the internal-combustion engines. Examples of these controls, with which most pipe liners are completely familiar, were the Great Lakes system and the Phillips Petroleum Co. lines.

Where fixed-speed electric-motor drives were used coupled to multi-staged centrifugal pumps in tight line operations, the centrifugal pumps were throttled to throughputs to match the input from the upstream line and not exceed the pressure limitations of the downstream line. Where products of not widely varying viscosities were pumped, throttling losses in this type of station were not severe. In starting such units with reduced-voltage starting and an appreciable time limit involved in bringing the motor and pump up to speed, delaying action in opening the pump discharge valve was required. However, such stations could be built with air controls for throttling based on suction and discharge pressures and with delayed opening of the discharge valve so that starts and stops could be handled automatically from the pressure existent in the main line.

Secondary Control Apparatus

If the downstream section of the line was short enough to absorb the "pack" without overloading the pump and motor by excessive throughput, slow opening of the discharge valve was sufficient protection to assure the pump going on the line. Secondary control apparatus consisted of thermal protection of pump bearings, motor bearings, pump-case temperatures, and stuffing-box temperatures on pumps together with emergency low-pressure suction and high-pressure discharge controls, all tied into a shutdown sequence of the pump and motor to assure the station stopping in case of emergency. Such stations could be started and stopped either by pipe-line flow rate, controls tied to meters in the station, or by line-pressure controls which were a function of flows through the line. Excellent examples of this type of station are those of Susquehanna Pipe Line and Shell's East line.

Lines which handle one product only and have intermediate stations which should operate whenever the initial station operates can use synchronous motor drives and reciprocating pumps which can be exactly matched to the line characteristics. These stations can start and stop automatically on increase of flow or pressure in the pipe line at the station, and, since they require no differential pressure at the start, involve no particular difficulty in starting. The only necessary control on such a station are thermal and pressure controls to shut the stations down in the event of emergency and a small bypass stream around the pump controlled by conventional air controls to prevent the pump's throughput exceeding the line's throughput. A good example of this type of station is the Shell Oil Co. natural-gasoline-line station on the Ventura line in California. This station, incidentally, is completely unattended and visited weekly or twice weekly by pipe-line maintenance men to check the control equipment.

With the exception of the last station named, all pipe-line stations of which the author has knowledge have attendant operators either on a part-time or full-time basis, and the automatic controls are justified by ease of operation, greater throughput, and more accurately controlled pressures than can be achieved by hand. Each type of station has certain limitations and drawbacks and certain advantages. On lines which have approximately fixed pumping pressures by virtue of uniform viscosity or fixed pumping rates by virtue of design fitted to maximum viscosities and penalizing throughput on low viscosities, the reciprocating pump has the advantage of higher efficiency and better use of power, but the disadvantage is of pulsating flow with the stresses incident to pressure surges and the difficulties involved in pulsating flow if throughputs are metered.

The centrifugal pump with its ease of control and its freedom from pressure surges suffers by comparison to the reciprocator because its power efficiency is appreciably lower. This disadvantage is offset by its ability to handle a greater range of volumes, the fact that it creates greater pressures on higher-gravity fluids which require higher pumping pressures, and its low cost of maintenance and repair. Part of its inefficiency is attributable to the very flexibility which is one of its advantages, and it was in an effort to make use of the advantages of the centrifugal and minimize its disadvantages that we recently designed four new stations on Shell's East line to operate unattended by push-button control over a dispatching teletype system.

Unlike most pipe-line stations, these East line stations boost only half of the normal pipe-line working pressure, which in the primary stations is 1,200 psi. In the new stations intermediate to the primary stations the pressure boost is 580-600 psi. on gasoline and between 650 and 700 psi. on fuel oil.

The stations have no throttling controls but operate wide open whenever they run. Thus the disadvantage of throttling the centrifugal is set aside, and instead the stations are operated or shut down as the hydraulics of the line require. They provide approximately 5,000 bbl. per day additional capacity on gasoline, or if run on fuel oil provide the additional boost to match fuel-oil rates to gasoline rates in other sections of the line in which the intermediates do not operate. Thus they provide the excess horsepower required for pumping fuel oil at gasoline rates, or alternately provide additional capacity in gasoline. They pump a short section of line, approximately 26 miles, thus the downstream pack required at start constitutes only a few barrels.

Control of Basic Station

The control of the station itself is extremely simple. Basic piping in the station consists of the usual inlet and discharge lines across a check valve in the main line, this valve being a soft-seated type. The suction and discharge of the station are taken off upstream and downstream from the check valve, and

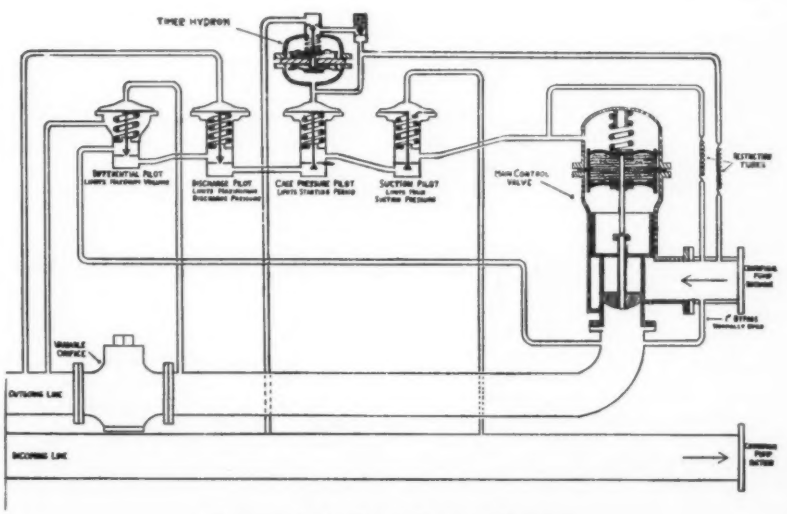


Diagram of pipe-line-station control system.

the station block valves are located in the main line approximately 100 ft. upstream and downstream from the station (see Fig. 1). Thus, if work is required to be done on the check valve in the main line, the main line must be blocked and shut down. The choice here is between building a station on a bypass or across a valve in the main line, and experience with these bypass checks has been so satisfactory as to justify location of the check in the main line.

Main-station suction and discharge valves are 8-in. gates, motor driven through "limit torque" gear drives. The sequence in starting the station, either by push-button or teletype control, is first a simultaneous start of the seal-oil pump, the water circulation pump over the pump bearings, and the opening of the suction valve. The gear drive on the suction valve requires 1 minute for completion. At completion of suction-valve opening, the suction-valve limit switch closes the main full-voltage motor starter, and the motor-pump combination "pulls in" in 13 to 15 seconds. Through timing relays, 5 seconds after motor start, the discharge valve begins to open. The discharge valve requires 1 minute opening time but permits liquid flow approximately 13 seconds after the motor drive starts. Thus, 18 seconds after main motor and pump start, the discharge valve opens gradually and the station is fully on the line with balanced suction and discharge pressure in approximately 40 seconds after motor start with no overrange of horsepower or suction or discharge pressure.

Mechanical Seals Double Operating

The shutdown sequence by push-button or teletype control opens the main motor starter contactors and starts the closure of both suction and discharge valves simultaneously. Seal-oil and water pumps run until the limit switches operate on suction and discharge valve closure 1 minute after main motor breakers open. The mechanical seals in the pump are double operating on lube oil sealed away from the liquid in the pump and the atmosphere outside the pump. The seal-oil pump previously mentioned provides approximately 60 psi. excess pressure of lube oil over main pump first-stage pressure, this differential being provided by piping resistance on the flow of oil from seal-oil pump through seals and back to seal-oil balance tanks. These two seal-oil tanks in turn provide a water-sealed U-tube with lubricating oil on the pump side and product at first-stage pressure from the product side. Thus, the seal-oil pump provides a constant excess differential pressure of lube oil over product pressure behind the seals.

Emergency shutdown equipment consists of Mercoid switches which shut down and lock out the pump on increasing temperature at motor bearings, motor windings, seals, pump bearings, pump case; also with substandard inlet pressue of product to the pump, excess discharge pressure, and low differential pressure on seal oil or water circulation. In addition to all the foregoing, continuous vapor analyzers shut down the pump if inflammable vapor mixtures are present at either the seals or on the pump-room floor. This latter feature of protection is provided by continuous vapor analyzers, which tie into the shutdown sequence of the station.

Any electrical fault in the control system, motor overload, undervoltage, and when starting, open-phase or reverse-phase sequence will cause a station shutdown and lockout. It should be understood in this description that these stations have no throttling control and operate strictly on the balance of throughputs and pressures in the line, the stations being started or shut down at the discretion of the dispatching office by remote control over the teletype system.

Four Selector Circuits

The teletype control of the stations is based on the fact that American Telephone & Telegraph Co. can provide four selector switching circuits on its long-line teletypes. In the case of the stations under discussion, the four selector circuits are used to start the station, report intelligence from the station to the dispatching office, stop the station, and sound an emergency siren to apprise the resident in the station that emergency conditions exist which require his presence. While the switch gear which accomplishes these tieins is fairly complex in the aggregate, the individual sequences are quite simple.

Taking the functions in the order described, starting of the stations is accomplished by dialing a number on a dial very similar to an ordinary telephone dial in the dispatching office. This dialing sets up a code sequence across the teletype circuits to operate the selector system on the receiving teletype, which in turn locks up a relay in the A.T.&T. panel, which energizes a relay in the switch-gear panel which in turn locks in the starting sequence previously described. This impulse having been transmitted, the station comes on the line and assumes its normal pressure balance in the line at the augmented throughput which the station provides.

With the station either running or shut down, another number dialed from the New York dispatching office sets up the second selector circuit in the panel, closing a relay which transfers current to switch-gear panel, there closing a relay which actuates the reporting sequence. The instrumentation for this reporting sequence includes a suction-pressure transmitter, a discharge-pressure transmitter, and a motor-current recording transmitter, each in turn coupled to recorders in the control house and telemeter pulse duration transmitter also in the control house. The two pressures and motor-current readings are transferred electrically through selector relays to the pulse-duration transmitter which functions over a 15-second maximum time interval.

A voltage-sensing relay closes its contacts whenever the cam-operated magnetic transmitter provides a voltage exceeding that of the measuring magnetic transmitter to which it is connected. The sensing relay contact together with a contact synchronously driven from the camshaft provides a combination of signals for transmission to the teletype equipment. These signals are thus converted to a series of repeated letter pulses to the station teletype, which in turn reproduce letters on the teletype-writer in the dispatching office.

In the first 15 seconds after dialing for intelligence, "S's" are transmitted over the teletype in series, each letter S representing 20 psi. of suction pressure up to 60 letters representing 1,200 psi. During the next 15 seconds "D's" are transmitted on the next line of the teletype representing 20 psi. per symbol up to 60 symbols representing 1,200 psi. In the third 15-second interval, "A's" are transmitted up to 60 symbols, each representing 2½ amp. up to a total of 150 amp. At the end of the 45-second three-line transmission, the station signs its call letters.

One-Minute Shutdown

Dialing a third number from the dispatching office initiates, in the same manner previously described, the shutdown sequence, and the shutdown is accomplished in 1 minute after dialing with the station isolated from the line with both suction and discharge valves tightly closed and with the fluid stream in the pipe line going through the across-the-station check. Dialing the fourth number in dispatching office closes an A.T.&T. relay, in turn closing a relay in the station switch gear to operate the emergency siren for 20 seconds, thus calling out the resident attendant.

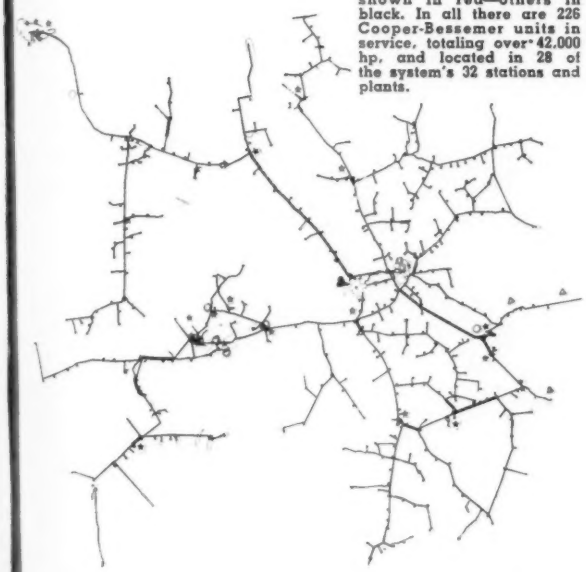
A shutdown dialed over the teletype leaves the station free to be restarted at any time in dispatching-office discretion. On the other hand, any shutdown of the station brought about by the thermal, pressure, or electrical controls locks out the starting sequence so that the station cannot be operated from the teletype until investigated, adjusted, and reset by the resident attendant. Thus, any underpressure on the suction, overpressure on the discharge, any thermal failure, any gas leakage in the station, any electrical surge, voltage failure, or motor overload will shut down the station and not permit it to operate again until the attendant has had a chance to investigate any

Another Example of Efficient Power at Lower Cost

ON THE LONE STAR MAP....

★ Compressor stations
△ Cycling plants
○ Gasoline plants
□ Generator units

....30 years of Cooper-Bessemer power from early horizontals to the latest GMV Turboflows



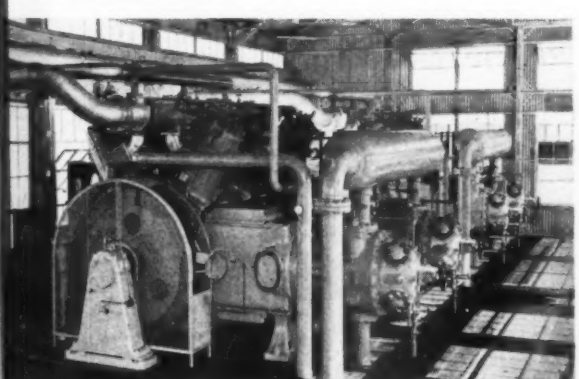
Cooper-Bessemer powered stations and plants are shown in red—others in black. In all there are 226 Cooper-Bessemer units in service, totaling over 42,000 hp, and located in 28 of the system's 32 stations and plants.

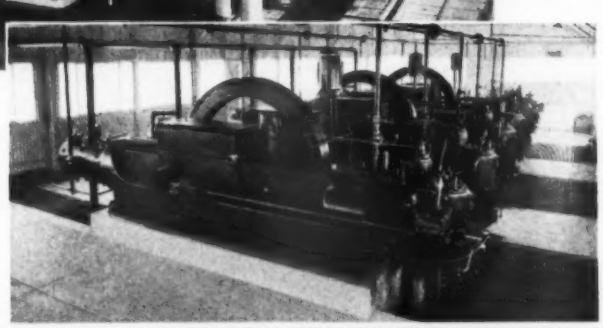
THE map pictures the Lone Star Gas Company's complex system as it is today. It is also evidence of this company's progress, wise management, sound growth . . . and success.

For over 30 years, Cooper-Bessemer has continuously played a major part in meeting Lone Star's power needs of every description . . . engine-driven compressor units, large and small, for gas transmission, cycling and natural gasoline service . . . gas engines of various types for driving auxiliaries and electric generators. Most of the earliest Cooper-Bessemer units, 30 years old and older, are still in regular service, giving efficient, dependable performance!

It's this kind of performance that justifies the confidence Lone Star and other companies show in Cooper-Bessemer products and engineering. It will continue to work to Lone Star's advantage with their latest Cooper-Bessemers—modern GMV Turboflows, for compressor service at lower-than-ever cost.

Below: Two modern, latest type V-angle compressors, Cooper-Bessemer 660 hp GMV-6 Turboflow units, in Lone Star's Gainesville Station.





Left: These Cooper-Bessemer 170 hp Type 75 horizontal compressors, installed in Fox Station 22 years ago, are still in continuous service.

The Cooper-Bessemer Corporation

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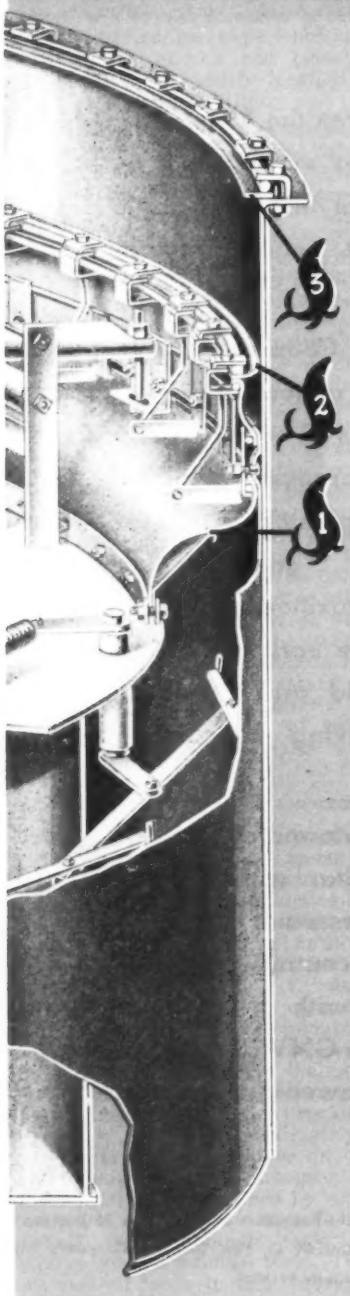

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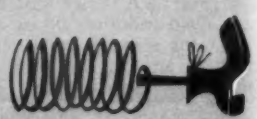
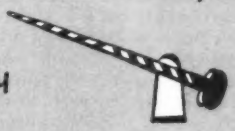
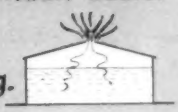
Look and see! Only the Wiggins Floating Roof has the famous Triple Seal. The Primary Seal combines a vaporproof seal fabric with a patented, long limber metal shoe  that exerts a uniform outward pressure, assuring positive constant contact all around the tank walls. The Secondary Seal, a neoprene-coated fabric ring, rides above the Primary Seal to eliminate wind losses around the periphery. The Top Seal says to vapor losses when the float is within the upper 3 feet of the tank top.

When the liquid is pumped in, the Wiggins Floating Roof

does this and when the liquid is pumped out, it does this.

Big roomy pontoons are separated into compartments for greater safety  and much easier inspection. Eliminates venting. 

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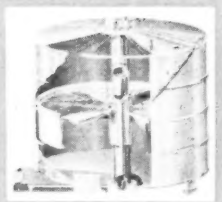

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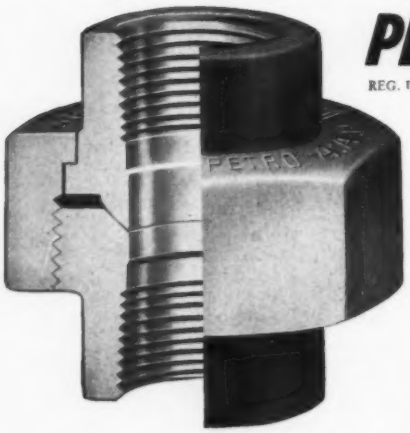

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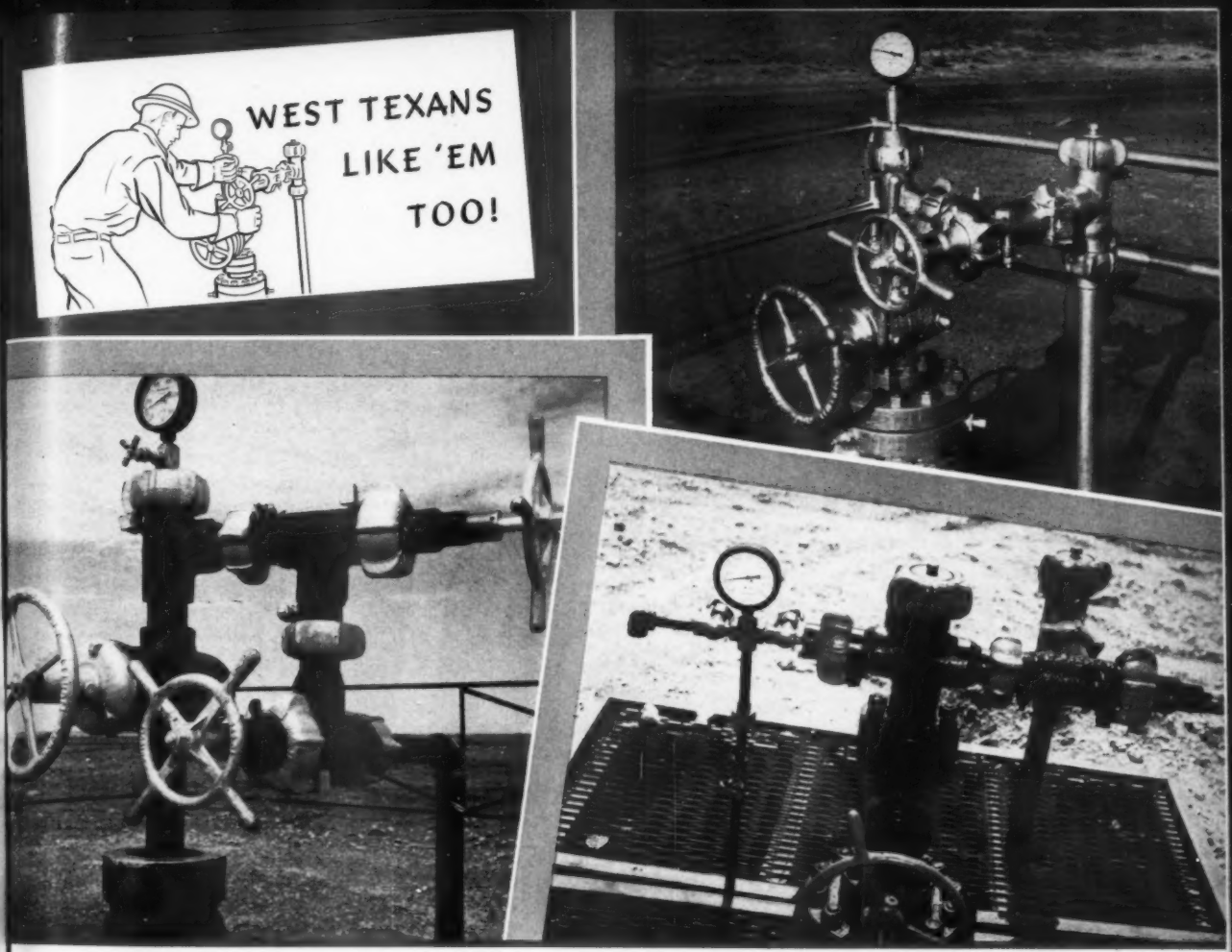
difficulty and make necessary corrections.

It has been noted that these stations do not throttle. Thus, they overcome one of the major items of inefficiency in constant-speed centrifugal pump stations in that the station cannot operate except wide open. It should be noted in this connection that the throttling load can be transferred upstream or downstream to the primary station if the dispatching office conducts the operations ineptly. However, since the stations provide differential pumping horsepower to match fuel oil against gasoline in the section where the secondary station does not operate or require that all stations operate on the same product, this becomes a remote contingency. It should be noted here that these stations can easily be converted to full hydraulic pressure with throttling controls with a minor addition to the control apparatus. Since the equipment for this control is already developed and in use in other stations, it merits description here.

The basic addition necessary to make a throttling station consists of a so-called "hydron" valve and its associated pilots. This hydron unit is a single-seated 90°-angle valve, piston actuated and controlled by hydron diaphragm topworks (see Fig. 2). The valve is spring closed with the spring load adjusted to a 5-psi. differential pressure across the valve and diaphragms. Upstream fluid pressure is under the hydron topworks diaphragms and regulated pressure is above the diaphragms. As the regulated pressure above the diaphragms is decreased below the upstream pressure, the diaphragms and the controlled needle-valve lift, permitting fluid to flow from above the piston through the needle-valve opening and connected fluid course to downstream of the valve. The release of fluid above the piston unbalances the piston pressures and lifts the main valve, thus establishing flow.

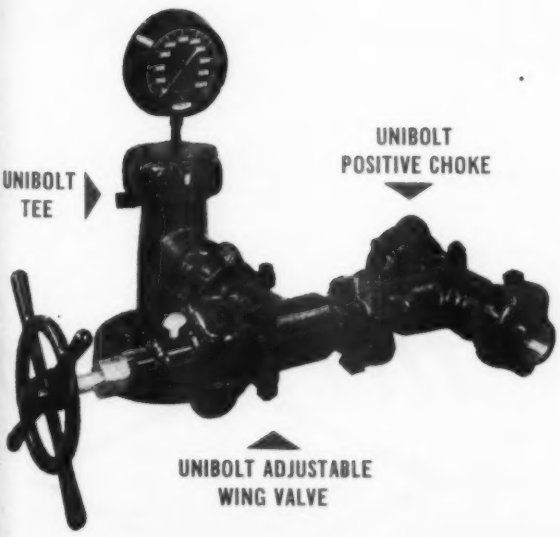
Separate needle and check valves control the rate of fluid passage from one diaphragm chamber to the other, thus permitting both opening and closing rates to be separately adjusted. In practice, the fluid-actuated piston follows the needle valve within thousands of an inch, and the valve operates without chatter regardless of throttling conditions.

In Shell's normal primary station, four pilots are used to control the hydron valve (see Fig. 2). Closure of any one of the four pilots equalizes pressures across the hydron diaphragms and closes the hydron valve. When all four pilots are opened, the main hydron is opened. Thus any single pilot can assume control of closure of the hydron. At pump start, as arranged in the primary stations, the hydron is closed because the case pressure pilot is closed. As the pump starts and creates differential pre-



Views from Scurry, County, Texas

UNIBOLT *Flow Manifolds*



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The units of the manifold — UNIBOLT Tee or Cross, Adjustable Wing Valve, and Positive Choke Body — are pressure-tested as a unit and may be assembled in a number of combinations to best meet individual needs. They are furnished in regular forged steel or in high-chrome alloy for corrosive wells — 6,000, 10,000 and 15,000 lbs. test. The manifold is completely salvageable.

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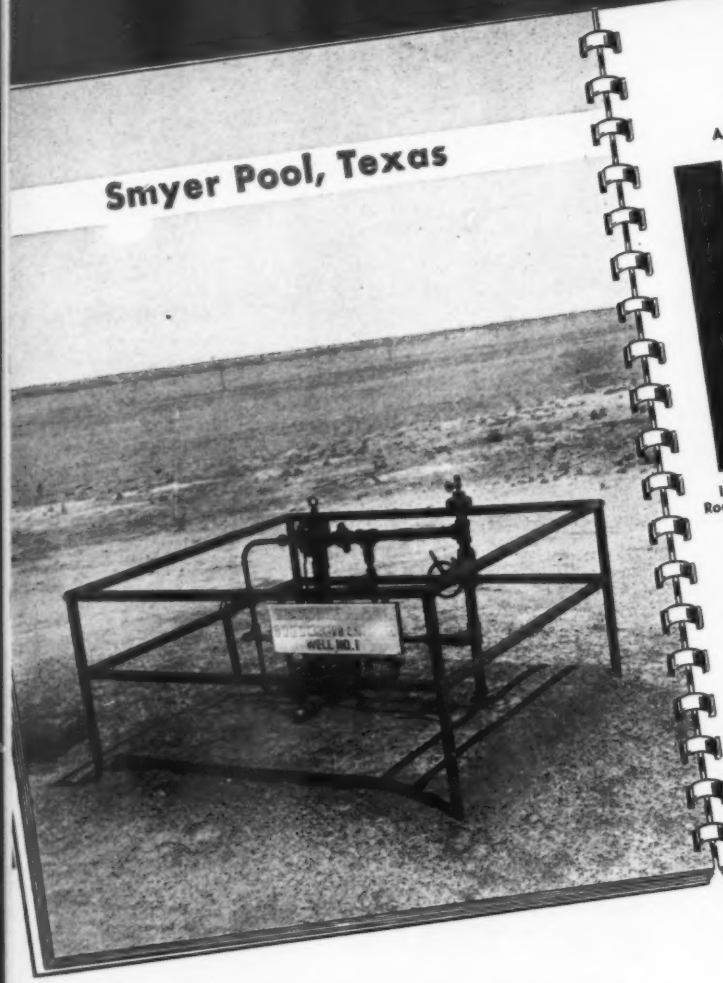

CASE HISTORY

COMPARATIVE OPERATING COSTS

The figures shown in the table below were compiled by an operator* who has producing properties in several West Texas fields.

His records show that his Free Pump-equipped Lease 3 in the Smyer Pool costs him less to operate than his other properties, even those that are flowing. This circumstance is partly a result of the Free Pumping system's facility for handling severe paraffin at a low cost, and partly a result of the labor-saving features of the system.

When comparing costs on Lease 3 with those on the beam-equipped Lease 1, he found the Lease 3 costs to be 28% lower. This reduction was effected despite the fact that the Free Pumps are pumping off wells 1,000 feet deeper than those on Lease 1.

OPERATING COST DATA

	Lease 1 Rod Pumped Levelland Pool	Lease 2 Flowing Slaughter Pool	Lease 3 Free Pumped Smyer Pool
No. of Wells	4	4	3
Average Depth	5,000 ft.	5,000 ft.	6,000 ft.
Period Covered	10 mos.	10 mos.	10 mos.
Oil Produced—B/M	2289	2458	2980
Operating Costs/B	18c	14c	13c

* We are authorized to furnish this operator's name upon request. Address Kobe, Inc., 3040 E. Slauson, Huntington Park, California.

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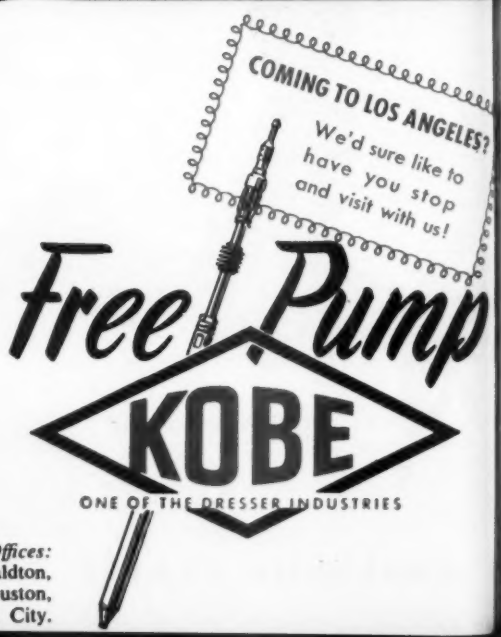

KOBE, INC.—*General Offices:* Huntington Park, California • *Division and District Offices:* Avenal, Bakersfield, Huntington Park, Ventura, California; Rangely, Colorado; Healdton, Oklahoma City, Tulsa, Oklahoma; Brownfield, Corpus Christi, Fort Worth, Houston, Kilgore, Odessa, Texas; Hobbs, New Mexico; Great Bend, Kansas; New York City.

sure, the case pressure pilot remains closed until the timer hydron closes its bypass, builds pressure on the case pressure pilot diaphragm, and opens this valve. This in turn permits the opening of the main hydron which opens slowly on its own adjustments.

As flow increases in the pump, a differential pressure builds across the variable orifice throttling the differential pilot and thus controlling throughput on the pump. As the discharge-line pressure builds and suction pressure decreases either or both the suction and/or discharge pilots assume control of the hydron valve and regulate the pump throughput to match the line throughput.

Addition of Hydron Valve

In the case of the new stations previously described, which operate with motor-driven valves to accomplish a regulated start, the addition of a hydron valve between the pump and the electrically operated discharge valve, regulated by suction and discharge pressure pilots, will provide a completely throttled station, although a differential-pressure-control pilot, actuated by the differential across an orifice, would need be added if the station overranged motor horsepower when pumping heavy oils.

Incidentally, this kind of station can be operated entirely automatically from line pressures or by teletype control as in the case of the present secondary stations, and the intelligence reports from the station could include both pump discharge and line pressures so as to indicate to the dispatching office the degree of throttling taking place in the station.

All of the apparatus covered in these descriptions is currently in use on Shell's East line and available for inspection at any time. The hydron valve and the hydron timer described are the invention of Norris Plank of Shell Oil Co. and are patented and are available through the Moorlane Co. of Tulsa.

The hydron valve can be used for any fluid control which can be controlled by direct pilots. The same valve may be used as a flow control, a reducing pressure control, a back-pressure control, or in special instances, as a closure valve in main-line operations in case of line breaks or excess pressure. This type of control has been found more satisfactory and more stable than air-instrument control. Simple proportional pilots are adequate for pipeline control, because the adjustments built into the hydron assembly permit separate adjustment of rate of opening and of closing, thus permitting adjusting which break up a cycle hunt by destroying the symmetry of the sine wave response of controls during a cycle. Thus rate action is possible with simple pilots and all the necessary fitting of time response of control to process lag is possible.

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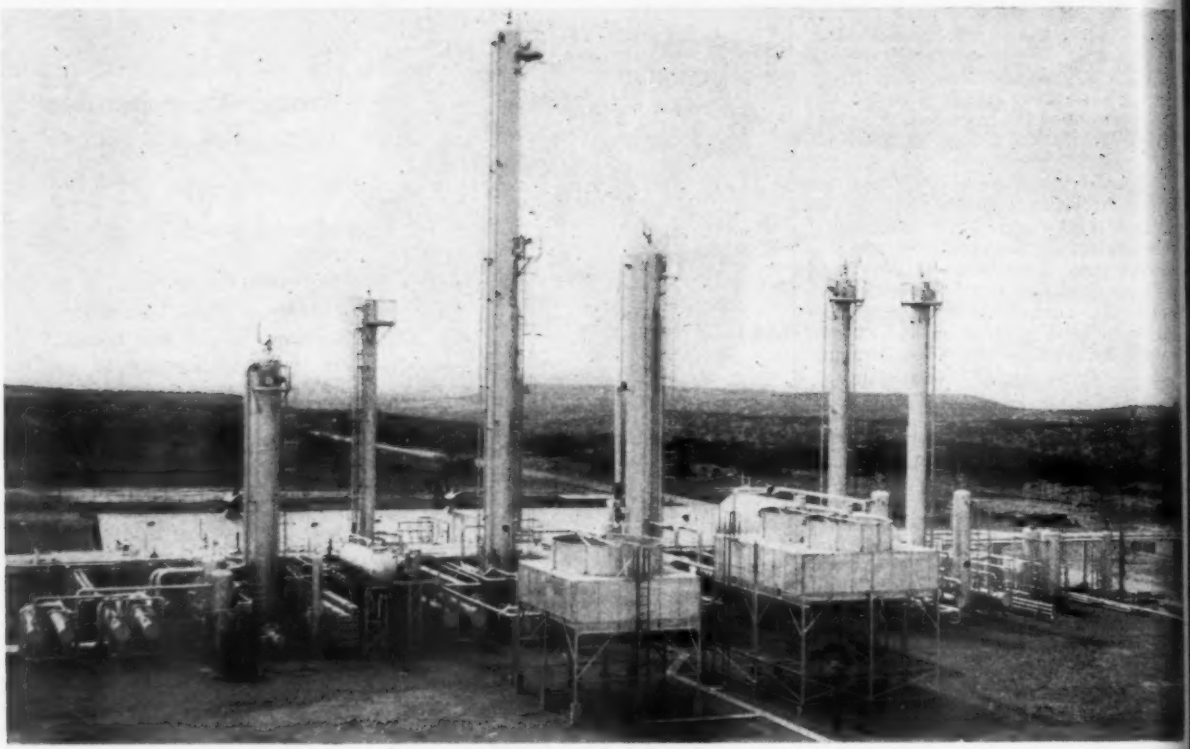

New natural-gasoline plant at Todd field, operated by Continental Oil Co.

Todd Deep Crinoidal Unit to Get Secondary-Recovery Facilities

Will be first such operation under Texas' new unitization law, passed last summer. Continental Oil will be operator

by Roy F. Carlson
West Texas District Editor

CONTINENTAL OIL CO., as operator, has recently begun construction of secondary-recovery facilities for the Todd (Deep) Crinoidal Unit. This is the first such operation under Texas' Unitization Law, Senate Bill No. 24, passed by the fifty-first session of the legislature last summer.

Such a plan must be approved by the Texas Railroad Commission, this requirement being written into the law. Although there are numerous cooperative plans operating in Texas, this unit operation, initiated by Continental, will be the first under the new law.

New Texas Unitization Law

The law provides that subject to Railroad Commission approval, after public hearing, persons owning or controlling production, leases, royalties, or other interests in separate properties in the same field, gas field, or oil and gas field, may voluntarily enter into and perform agreements for establishment of pooled units necessary to effect secondary-recovery operations for oil and gas and to establish and operate facilities necessary for these secondary-recovery operations. It also provides that these interests may establish pooled units and cooperative facilities necessary for the conservation and utilization of gas, including those for extracting and separating the hydrocarbons from the natural gas or casing-head gas and returning the dry gas to a formation underlying any lands or leases committed to the agreement.

Before approving such agreements, the Railroad Commission must find:

Public interest and owner's rights.—The agreement is necessary to accomplish the purposes listed in the paragraphs immediately above, and that it is in the public interest as being reasonably necessary to prevent waste, and to promote the conservation of oil or gas or both, and that the rights of the owners of all interests in the field whether signers of the agreement or not would be protected under its operation.

Costs.—That the estimated additional cost, if any, of conducting such operation will not exceed the value of additional oil and gas so recovered.

Other methods.—That other available or existing methods or facilities for secondary-recovery operations and for the conservation and utilization of gas in the particular area or field

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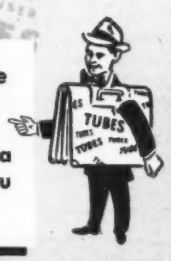
Croloy 3-M	(3% Cr, 1% Mo)
Croloy 5	(5% Cr, ½% Mo)
Croloy 5-Si	(5% Cr, ½% Mo, 1½% Si)
Croloy 5-Ti	(5% Cr, ½% Mo, ½% Ti)
Croloy 7	(7% Cr, ½% Mo)
Croloy 9-M	(9% Cr, 1% Mo)
Croloy 18-8-S	(18% Cr, 8% Ni)
Croloy 16-13-3	(16% Cr, 13% Ni, 3% Mo)
Croloy 25-20	(25% Cr, 20% Ni)

Ask your B&W Tube Representative for detailed technical and application data on any analyses you may require.



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TA-15538

are inadequate for such purposes.

Unit area.—That the area covered by the unit agreement contains only such part of the field as has been reasonably defined by development, that all the owners of interests in oil or gas under each tract of land within the unit area are given an opportunity to enter into such unit upon the same yardstick basis.

Development of unit. — That the agreement may provide for the location and spacing of input wells and for the extension of leases covering any part of lands committed to the unit so long as operations for drilling or reworking are conducted on the unit or so long as production of oil or gas in paying quantities is had from any part of the lands or leases committed thereto. Also it must not provide that any operator shall be relieved from the obligation to develop reasonably the lands and leases as a whole committed to the unit.

Parties to agreement.—That no person shall be compelled or required to enter into such an agreement and that such agreements shall bind only those persons who execute them.

Relation to field rules. — That all agreements executed under the law shall be subject to any valid order, rule, or regulation of the commission, and that no agreement shall attempt to contain field rules; and that no such agreement shall provide for nor limit the amount of production of oil or gas from the unit properties.

Refining; marketing.—That no such agreement shall provide for the cooperative refining or cooperative marketing of crude petroleum, distillate, condensate, or gas or any byproduct of crude petroleum, distillate, condensate, or gas. Extraction and separation of natural-gas liquids is not considered refining.

Joint ventures.—That no provisions of this unitization act shall be construed as requiring the approval of the commission of voluntary agreements for the joint development and operation of jointly owned properties.

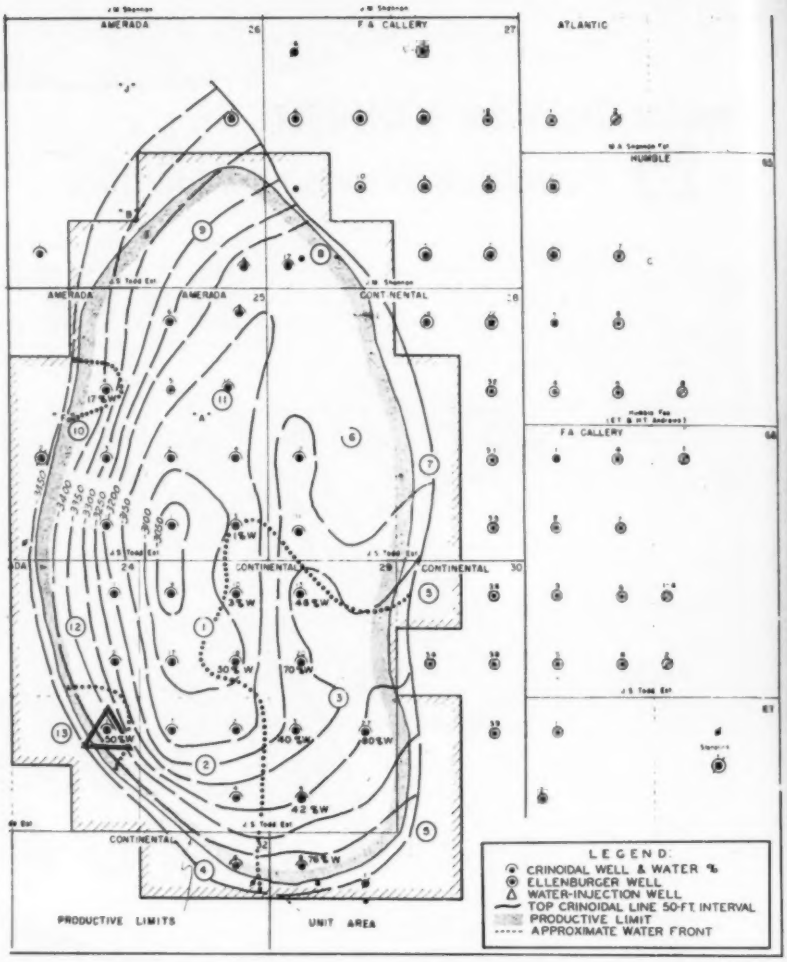

Fig. 1—Map of the Todd Crinoidal Unit showing productive limits, outline of unit area, approximate water front, and lime structure. Thickness of the Crinoidal lime runs from zero at the outer limits of the unit area to 400 ft. at wells numbers 1 and 9.

Other Details of Unit Law

Special sections of the law are devoted to the method of administering state-owned lands and other lands under the jurisdiction of the various courts in the State of Texas.

The act specifically repeals any part or all of laws that have previously been enacted by the legislature of Texas that are in conflict with the unitization law and to which the new law is a reasonable exception. But the

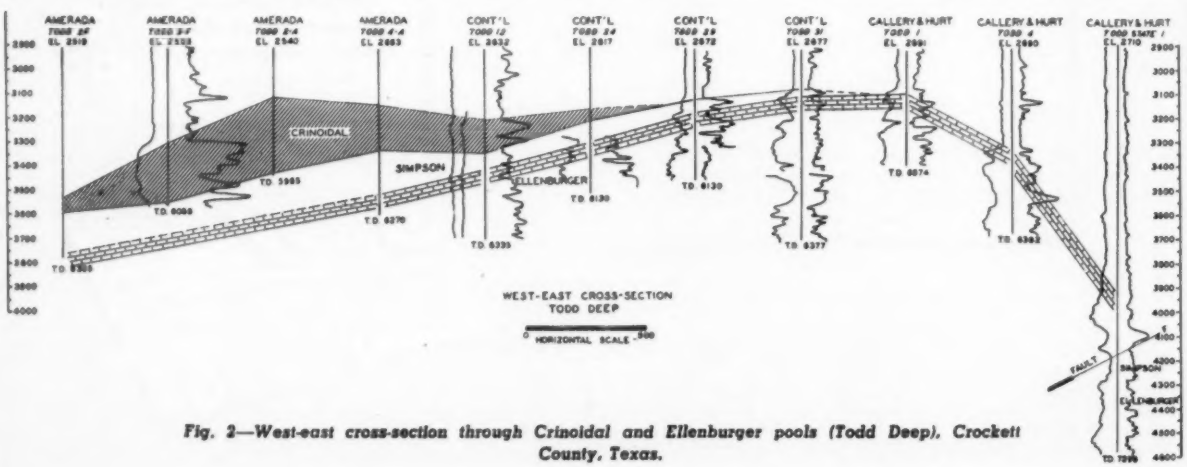

Fig. 2—West-east cross-section through Crinoidal and Ellenburger pools (Todd Deep), Crockett County, Texas.

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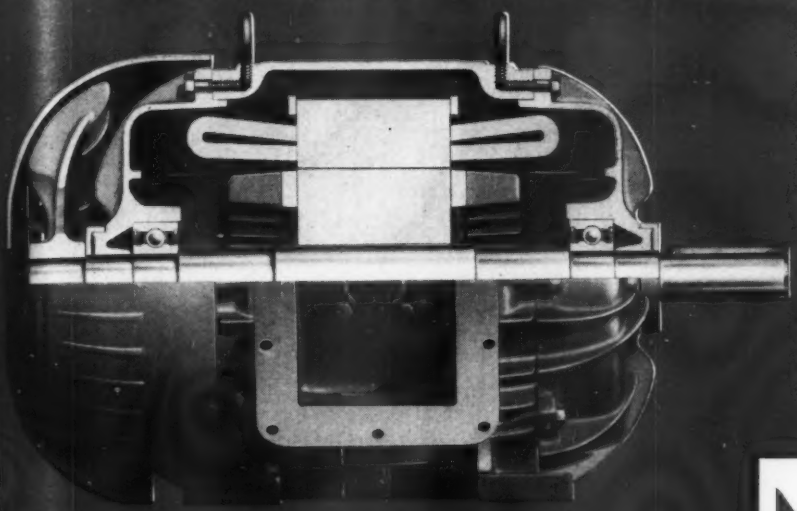

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Now, for refineries, chemical plants, grain elevators—wherever explosions are a hazard—Crocker-Wheeler offers an Explosion Proof Sealedpower Motor incorporating every wanted feature of the original "maintenance miser," the standard totally-enclosed, fan-cooled Sealedpower.

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act specifically states that it should in no way impair any part of the Texas Conservation Laws.

The law further states that "if any court should find a conflict between this Act and Title 126, Revised Civil Statutes of Texas, 1925, as amended, or Chapter 3, Title 19, Penal Code of Texas, 1925, as amended, (the antitrust acts) then this Act is intended as a reasonable exception thereto." But if any court should find that this conflict between this unitization act and the antitrust acts is not a reasonable exception, "Then it is the intent of the Legislature that this Act, or any conflicting portion hereof, shall be declared invalid rather than declaring the above mentioned Antitrust Laws invalid."

The Unit Agreement

In its capacity of unit operator, Continental submitted the unit agreement for approval of the Railroad Commission at public hearing on November 3, 1949. The commission issued a letter of approval on December 8, 1949, and the agreement became effective on January 1, 1950. The agreement itself is a combination operating and unitization agreement. Essentially it follows the plan of unitization used in other states where such laws are effective. As approved, the unit area shall include only the area shown in Fig. 1.

Each numbered tract — boundaries determined by royalty ownership— shares in production on the basis of acre-feet of effective formation. Each tract is allocated a per cent of participation in unit production in the proportion that the number of acre-feet of effective formation underlying that tract bears to the total number of acre-feet in the unit. Effective formation is termed any part of the Crinoidal limestone that contains oil, gas, or other petroleum hydrocarbons (unitized substances). The share of production will not be altered except through addition of new area determined productive by information obtained from subsequently completed wells.

Loss of title to any of the unitized area will automatically reduce the loser's share in production from the unit. Any expense resulting from such loss of title is to be borne by the operator losing title.

The unit agreement provides that suitable secondard-recovery facilities —gas injection, water injection, or a combination of both—will be constructed and installed, such construction to be commenced before July 1, 1950.

Any party to the unit operation has the right to "take in kind" his share of production, upon furnishing facilities therefor. The parties to the unit do not share in gas that is used for unit operations and field camp. Royalty will not be paid on unitized substances returned to the Crinoidal limestone, lost in handling, used or lost in secondary-recovery operations, or used in developing leases on the unit.

Operators committee. — An operators committee will be formed having one representative for each operator. Each representative has a vote on the operators committee in the same proportion that the operator shares in the production from the unit area.

To reach agreement in voting, 75 per cent of the voting interest is required. If one operator owns 65 per cent of the voting interest in the unit, at least one or more operators having 15 per cent interest must concur to carry a vote. If any operator owns more than 25 per cent interest, such party is bound by the unanimous vote of the other members, provided their combined interest constitute a majority interest in the unit.

The operators committee has the power to appoint a unit operator; to approve or disapprove workover, recompletion, abandonment, or change of status of any well and to approve or disapprove use of any well for injection; to approve or disapprove drilling of new wells; to determine daily amount of unitized substances produced from each well or returned to the formation, subject to allowables; and to approve or disapprove

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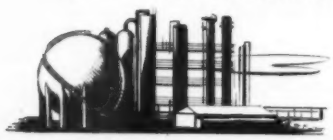

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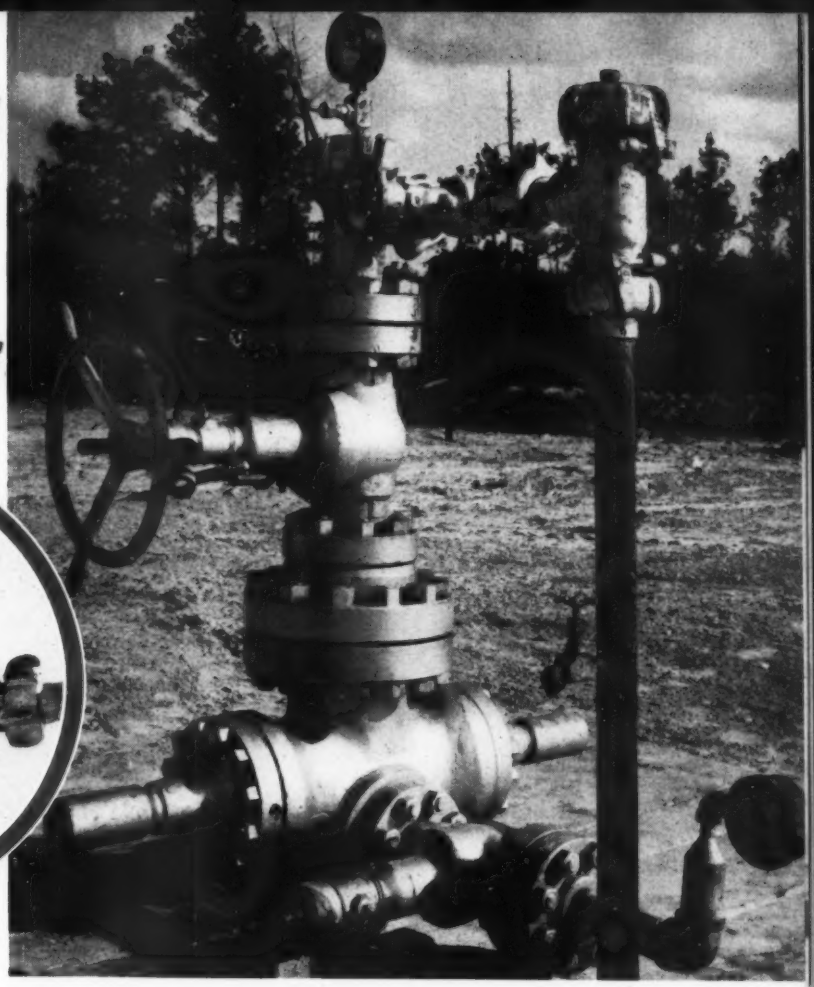

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of expenditures in excess of $5,000.

Royalty owners also may form a committee to advise and consult with the operators committee, and to inspect the books, records, and data pertaining to the calculation of percentages of participation and payment of royalties.

Unit finances.—The unit operator is given a lien upon the interest belonging to any operator and if an operator fails to pay his share the unit operator may foreclose. In the event of such foreclosure and sale, the remaining operators may buy such interest in the proportion that they share in the unit.

In the initial adjustment of investments, the cost of drilling and completing a well in the Todd Crinoidal formation is fixed at a flat sum per well, exclusive of casing, tubing, and other producing equipment. When inventorying equipment prior to entrance into the unit, the equipment in wells is to be valued at 75 per cent of its price as new equipment.

Gross production, sales, gathering, or transportation taxes to be paid by the unit operator shall be charged proportionately to the operators (lease owners) and royalty owners. All ad valorem taxes on mineral, leasehold, royalty, overriding royalty, or other interest in the unit are to be paid by the parties owning such interests. Ad valorem taxes on all personal property are to be paid by unit operator as a unit expense. The unit operator is given easement or right-of-way for construction of facilities for producing, gathering, processing, and disposing of production of unitized substances.

The Field and Reservoir

As the unit is now planned the operator will inject water into one well in the southwest portion of the field, as shown on the unitized-area map (Fig. 1). Plans are to inject gas at a later date through one of the centrally located wells near the top of the structure.

The Todd Crinoidal pool was discovered on April 3, 1940, at a depth of 5,691 ft. The discovery well, 2 J. S. Todd, produced 840 bbl. in 12.5 hours. Lack of pipe-line facilities caused sporadic development. Development has been on 40-acre spacing density. Thirty-one producing wells have been completed, one of which has now been converted to a water-injection well.

The casing program in the field includes 9⅝ or 10¾-in. pipe to 500 ft. with a salt string of 7⅝-in. pipe set at 1,900 ft. and a 5½-in. oil string either set into the top of or through the Crinoidal zone. A low-water-loss mud is used for drilling into the pay. Some wells have been acidized.

Geology.—The crinoidal reef structure is a limestone deposition on the west flank of an Ordovician high, having a 2¾-mile-long north-south-axis, and is a mile in width (Fig. 2). Underlying the Crinoidal zone is the

Next time "see" every wildcat foot drilled – *as it is drilled!* Don't wait until the hole is abandoned and then wonder if you missed a stray pay.

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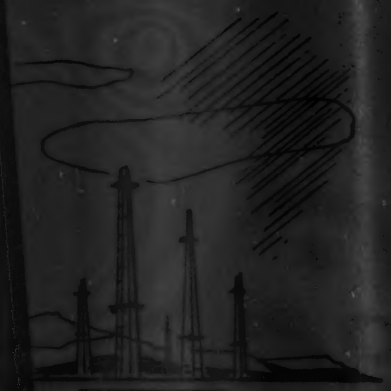

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But there are so many money-saving factors involved in the use of Black Magic that the few dollars saved by completing the well with a water base mud can be the most costly dollars ever saved!

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These are just a few of the many advantages of drilling-in with Black Magic, plus the fact that characteristics of Black Magic are easily maintained whereas water base muds require constant attention and treatment. In deep wells (below 10,000 feet) the cost of maintaining water base muds has consistently run as much as ten times the cost of maintaining Black Magic. Black Magic is unaffected by cement, salt, anhydrite, gypsum, limestone, *and can be used over and over again.*

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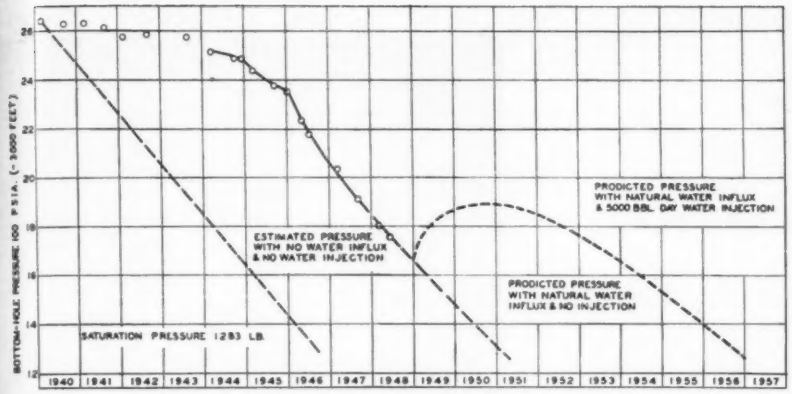
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Fig. 3—Electric analyzer predictions for Todd Crinoidal reservoir.

Simpson formation which, as shown by the cross-section (Fig. 2), is about 200 ft. thick on the lower flank and decreases in thickness toward the crest. The structure has steep dip on the west side and gentle dip on the east side.

The Crinoidal lime section from which production is obtained ranges from 0-400 ft. in thickness and is overlain by a stratum of dense black shale that seals the top of the trap. The lime section varies from a porous, permeable, and sometimes cavernous limestone containing numerous crinoid fossil to coarsely crystalline limestone of low porosity. Neither porosity nor permeability is uniform.

The limestone section may be roughly divided into two parts, the upper two-thirds being composed of the poorly cemented fossils, and the lower one-third being composed of the crystalline limestone with many shale breaks. This division has been determined from drilling time and cutting samples.

Coring Data

Two wells in the field have been cored. In one of the wells, from which a recovery of 58 ft. (37 per cent) was obtained, only 9 ft. had measurable permeability. The permeability measured 1.6 md. with 7.6 per cent porosity. On the basis of a productivity test the well had a calculated flowing potential of 2,480 bbl. per day, and a productivity index of 3.13 bbl. per day per psi. pressure drop.

The second well was cored with reverse circulation and a low-water-loss mud. A total of 132 ft. of formation was cored with a recovery of 61.8 ft. About 86 per cent of the 61.8 ft. recovered had permeability greater than 0.1 md., an average permeability of 13.6 md., and 11.7 per cent average porosity. Productivity tests gave the well a flowing potential of 12,778 bbl. per day with a productivity index of 24.1.

Productive limits of the field are established on the west and south by water, and on the north and east by Crinoidal zone pinching out against the Simpson. The water-oil contact was originally encountered at 3,450 ft. subsea. The average gross thickness of the formation is 147.8 ft. and the average connate water content is about 5 per cent.

Water-Injection Study

Early studies of reservoir performance indicated that there was some influx of water into the reservoir. This is rather minor, however, and since the crude is undersaturated the primary source of reservoir energy is fluid expansion. It was therefore decided to investigate the effect of an artificial water drive.

Calculations showed that without a water injection program and continuance of the then existing producing rate, the saturation pressure of the reservoir crude would be reached early in 1951 (Fig. 3). With a water injection rate of 5,000 bbl. per day, and assuming 3,400 bbl. per day of oil production, the producing life above the saturation pressure would be extended approximately 5 years, with a resulting gain of 6,000,000 bbl. of oil production. Oil recovery below the bubble point was assumed to be the same with or without a water-injection program.

The water of the natural drive appears to be encroaching most rapidly from a southeast direction (Fig. 1). There has been some water encroachment from the southwest, and it is in this area that water will be injected into the reservoir.

It is planned to inject the water as low as possible into the Crinoidal formation. A gravity-pump combination will be used for water injection. The water will be collected from pits in nearby Todd Ellenburger field where volumes of 5,400 bbl. per day will ultimately be available.

The water-gathering system will use gravity for the most part. No elaborate water-treating system will be necessary; however, the water to be injected will be run over a crushed limestone bed for the purpose of precipitating calcium carbonate and iron and liberating hydrogen sulfide.

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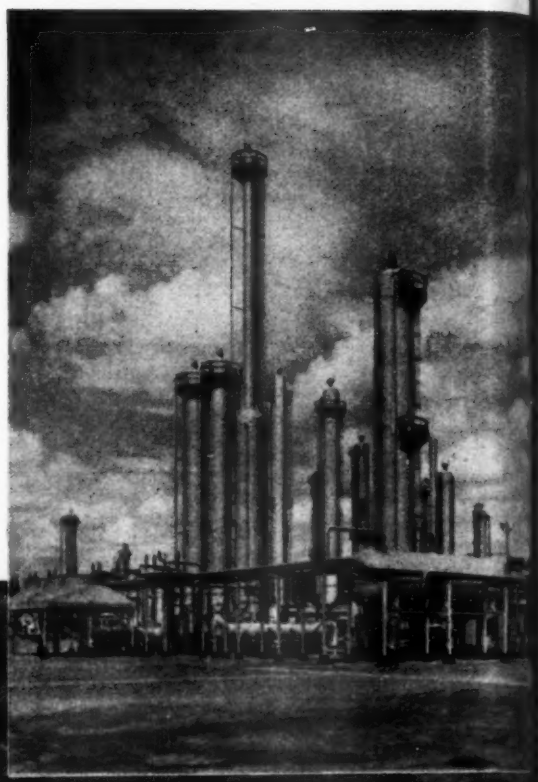

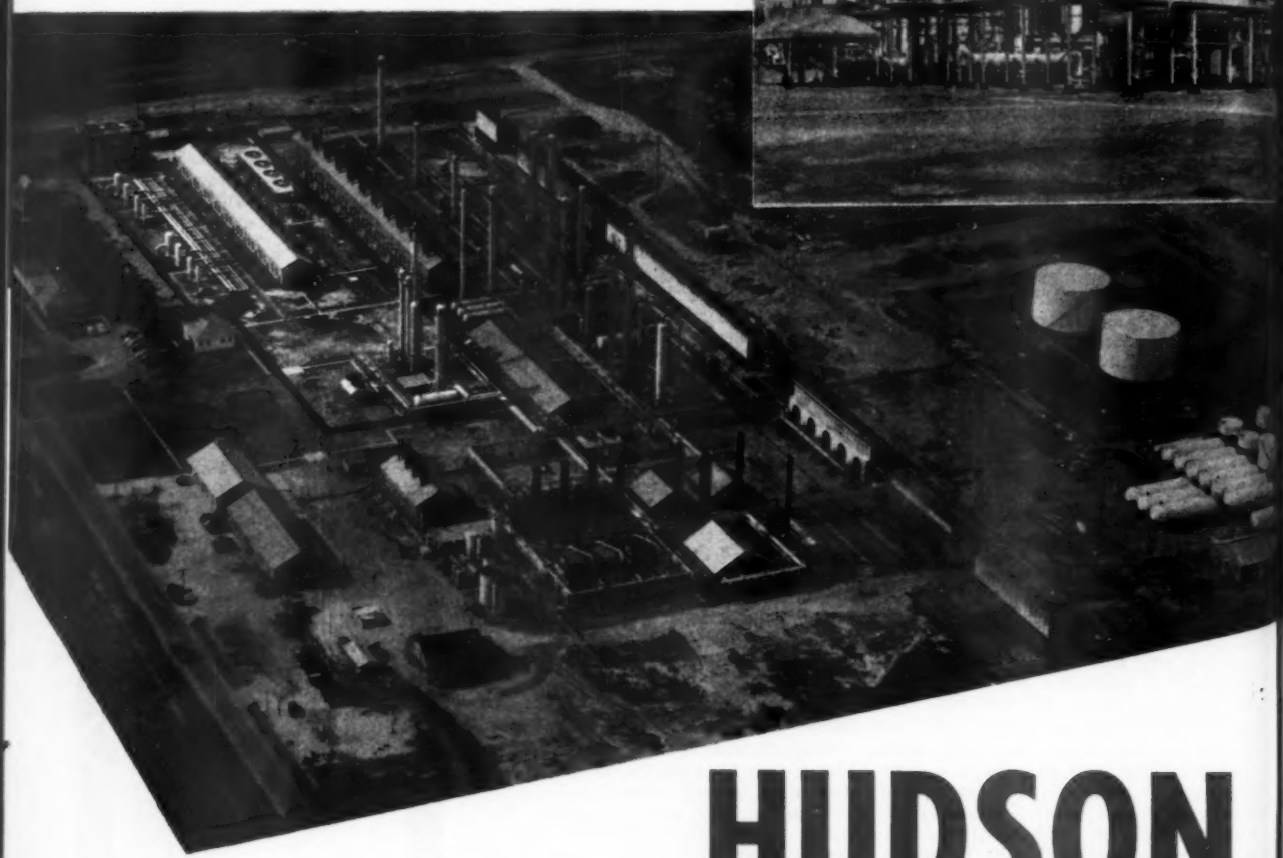

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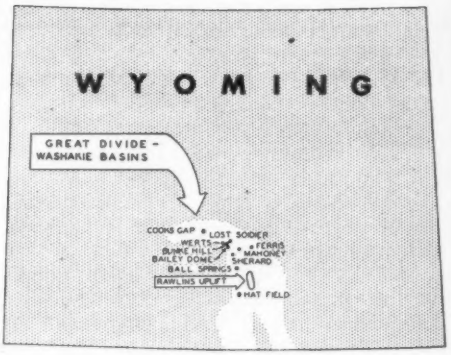

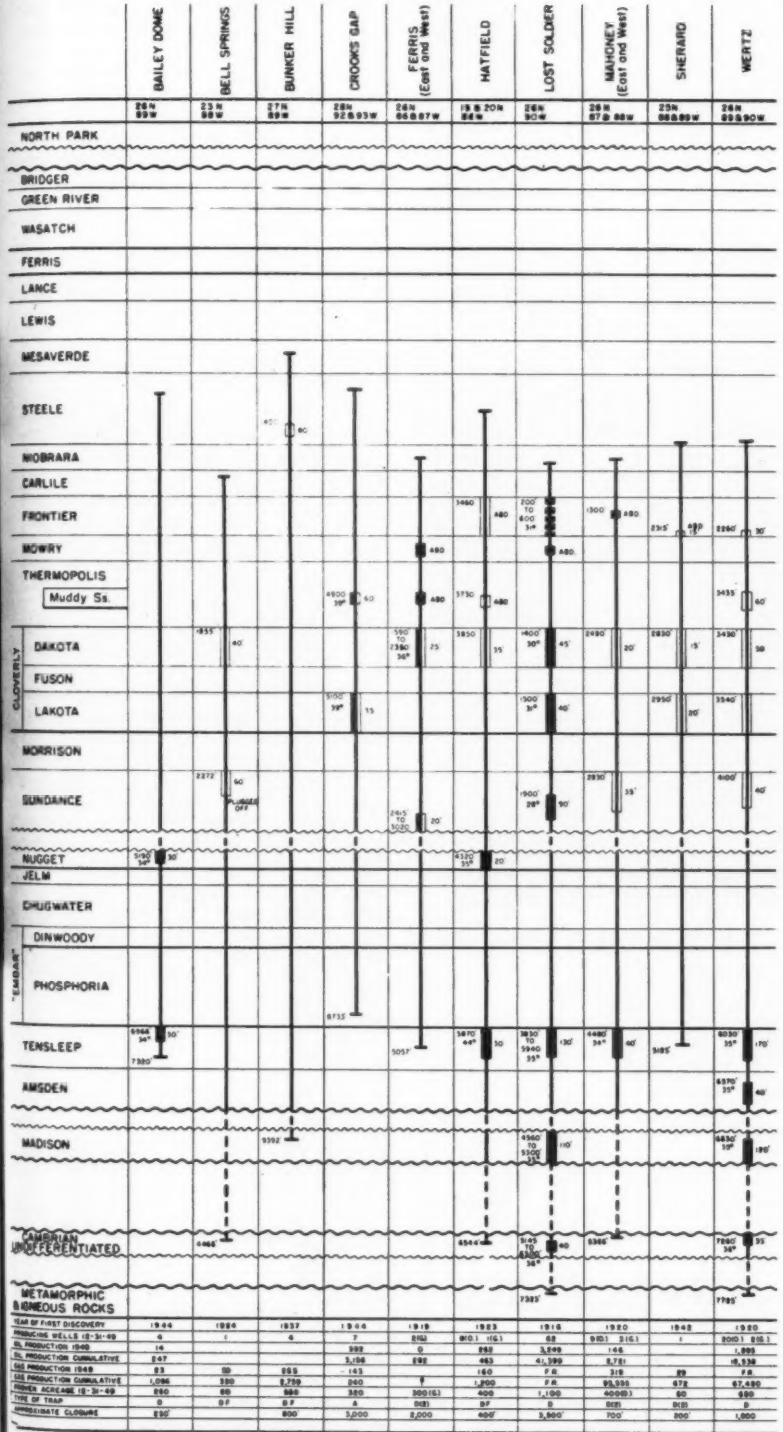

EXPLANATION

Approximate geologic horizon exposed on surface of crest of structure

Oil producing zone
Depth (average or minimum and maximum)
Gravity of oil
(average thickness shown on the right)

Gas producing zone

Oil and gas producing zone

Gas and condensate producing zone

Section missing

Deepest penetration

*Some wells start in Hillard overthrust on Wasatch. One to several oil or gas zones.

Fields and data are as of December 31, 1949, except for a few 1950 new zones and total depths.

Producing wells include active wells only. (O) = Oil. (G) = Gas.

Proven acreage is usually of the largest pool.

Oil production is in thousands of barrels.

Gas production is in millions of cubic feet.

C = Condensate. Amount not available.

Abbreviations Under Gas Production

F = Gas is used in field
L = Gas is blown or lost
R = Gas is used in recycling, repressuring or injection
S = Gas from outside sources is stored and withdrawn

Abbreviations Under Type of Trap

A = Anticline
AF = Faulted anticline
D = Dome
DF = Faulted dome
D(2) = Double dome
M = Monocline
T = Terrace
MU = Monoclinal unconformity
FT = Fault trap
N = Nose

Compiled by a Nomenclature Committee of the Wyoming Geological Association. Complete set of charts for Wyoming may be purchased through Petroleum Information, Inc., Box 2452, Casper, at $2.00 per set.

Information obtained from records of the Conservation Division, U. S. Geological Survey, State of Wyoming, Oil Companies, and other sources believed to be reliable.

XUM

Drill-Collar Failures

(Continued from page 81)

of approximately ½ million revolutions is required to drill these 1,700 to 1,800-ft. surface holes and even slight overstressing for such an interval causes much permanent damage to the connections. It is thought that the combination of high rotary speed and buckling of the collars in the large hole causes unusually high stresses.

Generally, it is best to use larger collars for the drilling of surface holes, even if only a few hundred feet deep. Rates of penetration are greater and damage to the drill collars is far less. Likewise, for any size hole it appears that the largest drill collars which can be used without hazard should be recommended.

4. Operation of crooked drill collars.—Much evidence has been gathered to show that crooked drill collars cause premature failure. It is readily understandable that crookedness must result in flexure of the string and that stresses would be concentrated at the connections.

Normally, at least for the low rotary speeds used in the Mid-Continent area, it is found that bends sufficient to be troublesome can be detected by a practiced eye when the drill collars are rolled on smooth racks or suspended in the derrick.

However, in the case of drill collars which have been dropped, bends are often concentrated at the connections. To detect these bends in the field, it is necessary to observe the drill collars while suspended in the derrick in stands, and through at least two breaks, so that every joint can be inspected when made up.

5. The corrosion factor.—For about 2 years, it has been suspected that corrosion fatigue is the cause of the painful plague of box failures in West Texas. Only in recent months has sufficient evidence been obtained to substantiate this theory. It was apparent from the start that such failures have been a real problem only in areas where corrosion fatigue affects drill pipe.

To prevent such failures, the obvious approach is to stop corrosion. At first, coatings of plastic or hard lacquers were tested, with varied results. Where the chromates have been used, they were only partly effective. It is possible that these tests were not conclusive because proper control was not exercised.

New approach. — The most recent development appears to offer a practical solution. A magnesium ring, such as illustrated in Fig. 5, is installed in the drill-collar box. By electrochemical action, corrosion of the steel in the bore near the ring is prevented. Note that the ring is located in intimate contact with the threads in which the failures start.

In offering such protection, the magnesium ring is itself consumed and apparently effective so long as any of the metal remains in place. These rings, or anodes as they can be properly termed, have been tested in only a few types of mud, but appear effective in all these.

Since it seems that corrosion can be stopped entirely, it is probable that corrosion-fatigue type failures can be

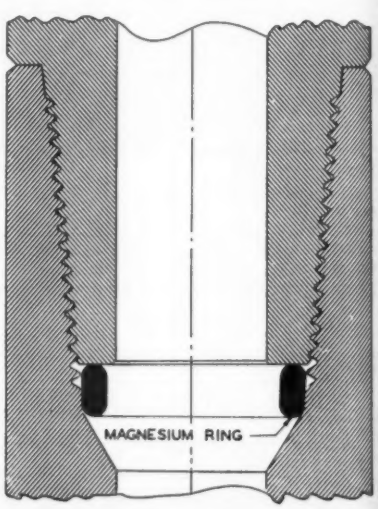

Fig. 5—Magnesium ring used for electrochemical protection of exposed box threads.

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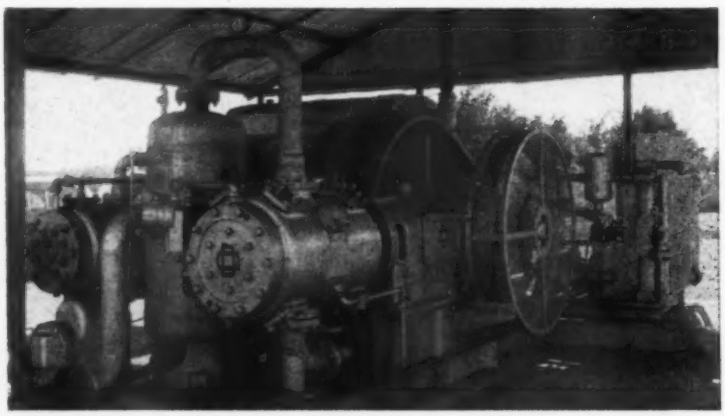

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eliminated. This means that box failures would then be no more of a problem in corrosive areas than in noncorrosive areas.

6. Maintenance.—Realizing that the need for high rate of penetration will always keep operating stresses at a comparatively high level, it is very unlikely that anyone expects drill-collar joints to operate indefinitely. Thus, if you are to forestall failures, some program of preventive maintenance should be initiated.

Remachining of all joints at short enough intervals will prevent ultimate fatigue failures. However, such a method is not only very expensive, but the drill collar must be consumed in the process. Further, it has been established that many of the joints are still in good condition at the point where others fail. Junking of such good joints should be avoided, especially in view of an impending steel shortage.

By careful grinding it has been found that fatigue cracks in their incipient stage can be safely arrested. It now appears that this method, properly employed, can be expected to increase the life of the joints several fold.

A lot depends on establishing the interval of inspection correctly so that cracks do not progress to the point where it is not practical or safe to remove them and put the joints back in service.

Delayed-Coking Unit

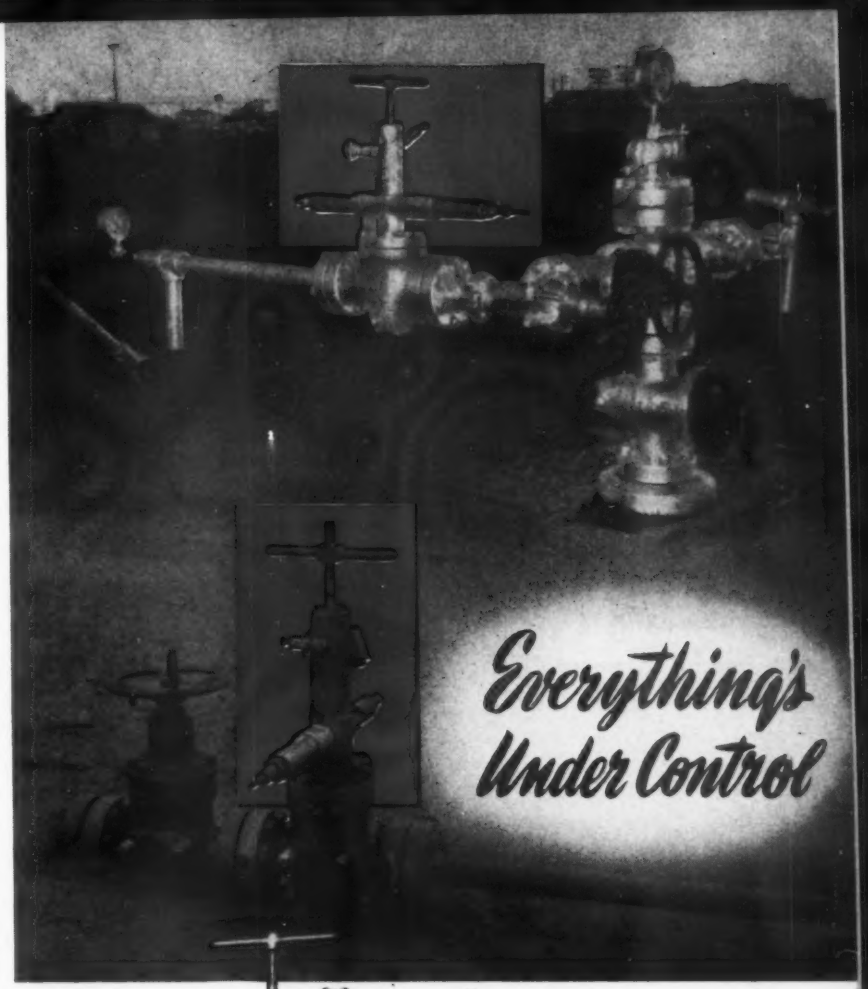
(Continued from page 77)

drums provide the residence time for the coke-forming reaction, and provide the necessary storage space for the 423 tons per day design production. Design vapor velocity is 0.272 ft. per second. Each drum measures 17 ft. 6 in. in diameter by 77 ft. on the straight sides (96 ft. 5 in. from top to bottom flange).

Drum walls are of carbon steel 1⅞ in. thick on the shell, 1 in. thick on the elliptical head, and 1⅜ in. thick on the bottom cone. Spot-welded alloy steel lining, type 405 (11-13 chrome) 7/64 in. thick covers the inside walls.

The vessels were fabricated at the job site from shop-rolled plates which formed one-half of the cylinder. The half sheets were joined in the field to form ring sections which were welded together at grade level to make approximately half of each vessel. The two half sections were then hoisted into the structure and welded in position.

Condensate drum.—Located between and below the two coke drums, the condensate drum plays an important role in the daily warmup phase of the operating cycle. This 4 by 10-ft. vessel receives in sequence, condensed steam, cold oil, hot oil, and finally hot oil plus hot vapors. Va-



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pors from the on-stream drum flowing downward through the empty drum pass out the bottom into the condensate drum whence heavy condensate is pumped back to the bubble tower. Hot vapors from the condensate drum flow to the regular coke drum vapor line going to the bubble tower.

Fractionating tower. — Coke - drum vapors are fractionated to produce gas, gasoline, and gas oil plus cycle gas oil, and reduced crude feed is stripped of virgin gas oil in a combination bubble tower.

Tower dimensions are 72 ft. 6 in. on the straight sides and 7 ft. 6 in. inside diameter. The carbon-steel walls measure $\frac{7}{8}$ in. in thickness. Strip-welded alloy lining 7/64 in. thick, type 410 stainless steel, covers the interior from the bottom up to the first bubble deck. These alloy strips are 4 in. wide.

All tower internals are alloy. Beginning immediately above the bottom accumulator section, five baffle decks with saw-tooth weirs provide contact between heavy fresh feed and coke-drum vapors. A gas-oil drawoff pan and vapor chimney lie above the baffle decks. Four shower decks, located above the chimney, effect a knock back of heavy gas oil in the hot vapors rising from the chimney by contact with circulating gas-oil reflux.

To prevent coke particles from entering the furnace charge pumps, a vertical cylindrical screen approximately 8 ft. tall was installed on the bottom drawoff nozzle.

Contractor and Pan-Am inspectors cooperated in checking vessel fabrication. Shop welds were spot X-rayed and stress relieved; field welds were subjected to Magnaflux inspection. The vessels were stress relieved in the field. A large burner, installed in the bottom head, and connected to natural gas and an air blower supplied the required stress relieving heat. One drum was soaked for 5 hours at 1,000° F. and the other for 7 hours at 950° F.

Furnace. — The furnace was designed specifically for coking operations. The radiant section containing only oil tubes provides a maximum heat pickup in a minimum of time. The oil enters the furnace in two parallel streams flowing through identical coils containing 46 tubes arranged in two rows of roof tubes and one row of wall tubes. Direction of flow is from the outside of the upper roof toward the center of the radiant firebox, down to the lower roof, outward to the wall, and down the wall tubes to exit near the bottom.

In a furnace designed for heating oil to coking temperatures without producing coke in the furnace tubes, velocity temperature relationships become critically important. Based on design throughput of 10,475 bbl. per day of 12.6° A.P.I. charge, the cold oil enters the tubes at approximately 5 ft. per second. At 800° F. design calculations indicate that the charge is less than 1 per cent vaporized and that the velocity is about 6.5 ft. per second. A calculated velocity of 10 ft. per second is reached at about 840° F. To prevent coking in the critical 5-10 ft. per second velocity and the 800° F. temperature range, 275 psig. process steam has been provided for injection at the inlet to the lower roof and at the inlet to the wall tubes.

Design operating conditions are 700° F. inlet, 920° F. outlet temperatures; 140-psig. inlet and 40-psig. outlet pressures. Fuel gas flow to the furnace is controlled by the oil temperature in a tube located in the wall bank 10 tubes from the outlet. The furnace convection section employs water tubes to cool the convection gases and to generate 150-psig. steam.

Gas-fired floor burners, 48 in number, provide a total heat release of 54,300,000 B.t.u. per hour. The total heater duty is 42,800,000 B.t.u. per hour with 34,000,000 B.t.u. per hour required for oil heating and 8,800,000 B.t.u. per hour absorbed by steam production.

Alloy material was used throughout the coking coils of the furnace. Coking coil tubes contain 6-8 per cent chromium and 0.45 to 0.65 per cent molybdenum. These tubes are 4 in. i.d. with ¼-in. wall thickness and are 36 ft. long. The oil headers have bodies and plugs of cast alloy steel containing 4-6 per cent chromium plus ½ per cent molybdenum.

Blowdown system. — The essential equipment items in the blowdown system include (1) a vertical blowdown drum 8 ft. i.d. and approximately 20 ft. tall, (2) a blowdown stack on top of the drum 3 ft. i.d. and extending to a height of 135 ft., and (3) three slop tanks totaling 3,300 bbl. capacity.

In regular operation the function of the blowdown drum and stack is to condense oil vapors purged from the hot coke drum which has been taken off stream. Inside the drum, five shower decks distribute a water stream entering from above to form a condensing curtain through which the vapors must pass. These shower decks are made of 10-gage 18-8 chrome steel. The drum itself is carbon steel with adequate corrosion allowance.

To keep heavy waxy materials in a fluid state, a 2-in. spiral steam heating coil was installed on the outside surface of the bottom dished head. To avoid excessive stack temperatures a temperature controller will open a valve to inject additional cooling water as required.

Condensed oil and water flow by gravity to the slop tanks whence the water will be drained to the sewer and the oil returned to the coking unit.

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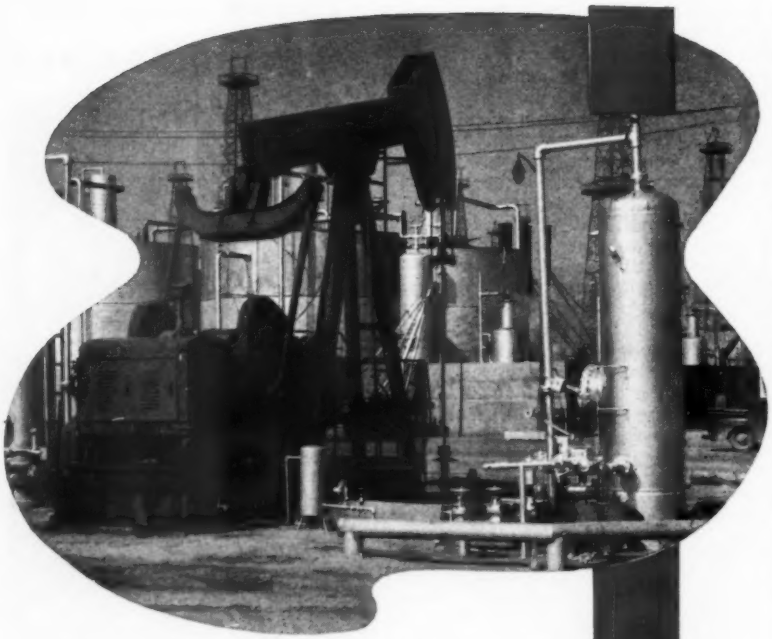

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ations. An eight-stage centrifugal pump delivers 700 g.p.m. at 1,900 psig. to the decoking water header at ground level. Pressure at the top of the coke drums averages approximately 1,825-1,850 psig.

A multistage steam turbine operating on 275 psig. saturated steam and exhausting at 25.5 in. of mercury vacuum supplies 1,110 hp. at 3,550 r.p.m. to drive the jet pump.

The high-pressure water stream requires special control to protect the piping from impact shock and to allow shutoff during decoking operations. Three air-operated valves function simultaneously to control the turbine speed, and to direct the water stream either to the decoking water piping or to a bypass return line.

The water flow control valves are air loaded as well as air operated. The control valve in the main discharge line is size 6 in. while the bypass valve is size 2 in. An air control station located at the top of the coke drums is so designed that at minimum air loading the 6-in. valve is closed and the 2-in. bypass opened while at the same time a spring-loaded air-operated valve in the steam line to the turbine is throttled to reduce turbine speed to one-third normal. At maximum air loading the valve actions are reversed and full water flow at maximum pressure is charged to the drill stem.

Decoking water piping. — Water from the jet pump flows up to the top of the coke drums through a 6-in. line. At this level, the line branches to two systems, one over each coke drum. When one branch is in service the other is blocked off by means of swing joints and Unibolt coupling bull plugs. Additional flexible connections are needed in the piping extending upward to permit vertical travel of the drill stem as the cutting proceeds inside the drum.

A permanently mounted drill stem over each drum delivers the high-pressure water to cutting jets. Three lengths of 6-in., Schedule 160, seamless pipe were joined by welding to make a straight stem 100 ft. in length for each drum.

Drilling and cutting heads are alternately attached to the bottom of the drill stem by Unibolt couplings. The drilling head contains four nozzles pointed downward; the cutting head has only two nozzles directing water jets horizontally through the coke bed.

Drill-stem hoisting equipment. — Heavy hoisting equipment, designed for 16,000 lb. deadweight load, raises and lowers the drill stem and top cross head during decoking operations. The cross head, which is guided in a vertical rail channel, supports the connecting swing pipes, the drill stem, and a rotary air motor. A single strand of ⅞-in. wire rope runs from the hoist drum to the top, over a 26-in. traveling block and returns

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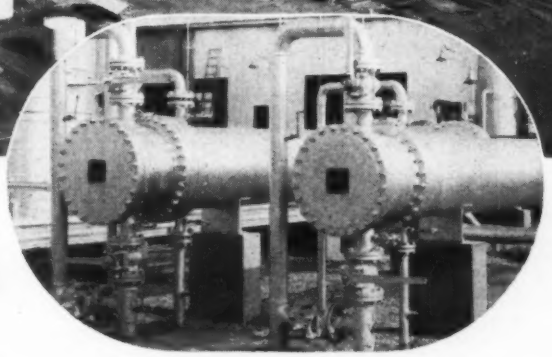

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to a firm fastening at the bottom of the top beam. The sheaves and traveling block turn on 3-in.-diameter axles.

The cable drum and power equipment are mounted at the same level as the coke-drum top heads. A 15-hp.. piston-type, air motor drives the heavy cable drum through a herringbone gear reducer with an input speed of 500 r.p.m. and reduction ratio of 87 to 1. The cable drum consequently revolves at about 6.3 r.p.m. At an average drum diameter of 2 ft. the cable travels approximately 40 ft. per minute and the traveling block one-half this speed or 20 ft. per minute.

A rugged steel derrick constructed above both coke drums supports the drilling cross head, drill stem, guide channels, and decoking water piping. This structure rises upward to 234 ft. above grade. The cable hoist load sheaves are mounted on top platform.

Coke-handling equipment.—The El Dorado coke-handling system probably differs from that used on other coking units. One method for handling the product pouring from the bottom of hydraulically decoked drums is to permit both coke and water to drop into cars beneath the drums. The water drains through holes in the cars, and the coke is transported to a storage area. Another method employs a crusher which reduces the lumps to a size which may be pumped in a water stream to coke storage. Neither of these methods is used at El Dorado; the elevation of the coking unit with respect to an adjacent storage area permits the coke to flow by gravity from the drums to a dewatering basin whence it is dragged to storage before loading into shipping cars. A plot plan showing the coke-handling system appears in Fig. 1.

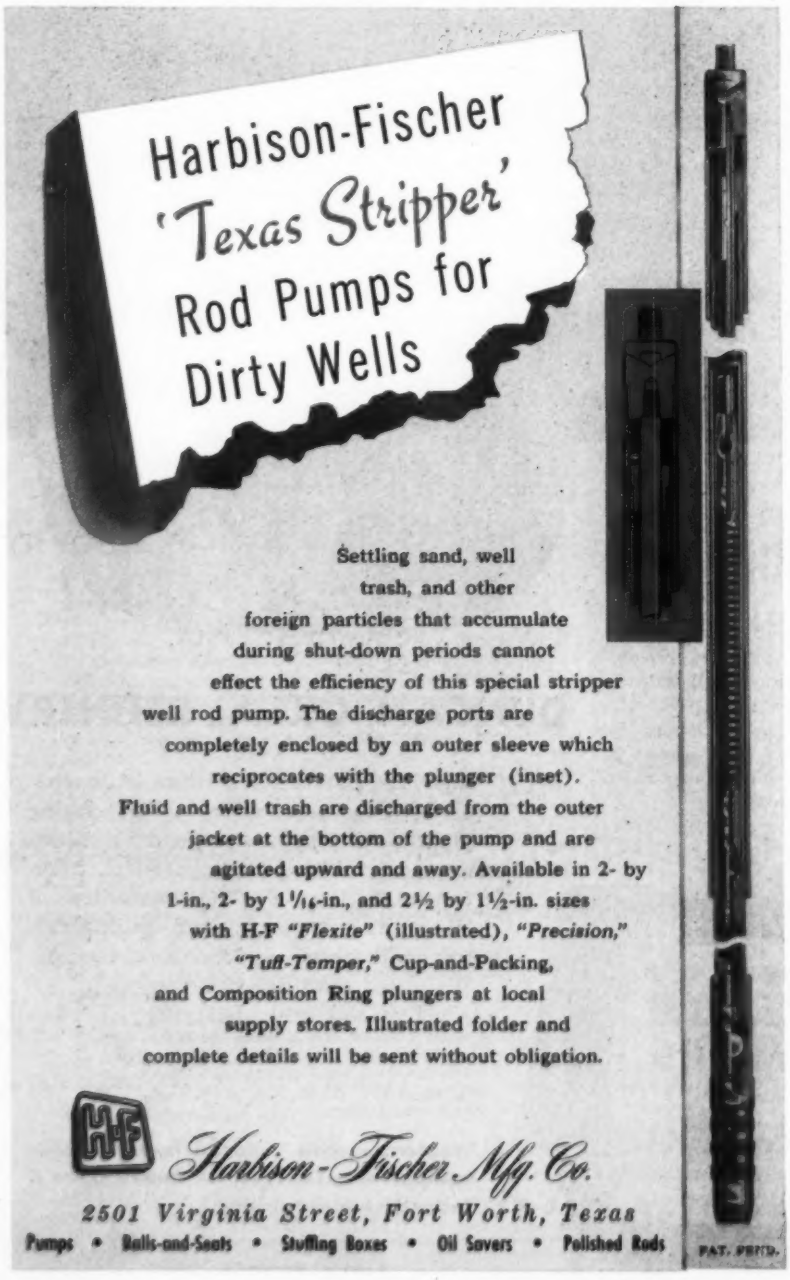
The contour of the land permitted a simple, yet unusual design for coke handling. The area immediately adjacent to the coke drums is approximately 35 ft. lower than the unit grade level. Steel chutes inclined at an angle of 28° and extending from a platform about 4 ft. below the bottom of the coke drums rest on concrete chutes also inclined at 28° to channel the coke into a dewatering basin. In this basin, water drains from the coke and flows through screens on each side to a decoking water separator box. The walls of the steel chute are 3 ft. high while the concrete chutes are recessed 8 in. in a concrete apron.

To remove the coke from the dewatering basin approximately at the same rate as it flows from the drums, a dragline system is used. The principal items of equipment for this system are: (1) two tail towers each 60 ft. high; (2) three cable drums driven by an electric-motor power unit; (3) a monorail at the coke drums; (4) a 4-cu. yard crescent-shaped bucket. The two tall tail towers, which stand 200 ft. apart, support a sheave for the ⅞-in. pullback cable and support a 1½-in. bridle cable from which a ⅞-in. drag cable is suspended. These cables attach to the dragline bucket and pass around the sheaves on the monorail at the coke drums.

The dragline system features a remote control station located above the dewatering basin at one side of the coke-drum structure. From this position the operator has full view of the coke falling from the drums into the basin and of the coke storage area. The electric controls are connected to the motor and cable drums located near the tail towers 350 ft. from the operator's platform.

In operation, the dragline is capable of moving about 145 tons per hour out of the basin, over an inclined ramp to temporary storage close to the basin. This intermediate storge will permit additional water drainage. After the drum is clean, the coke is dragged from the temporary storage pile to a shipping point near the loading track. Following a minimum of 24 hours draining time, this coke is loaded by a clamshell crane into shipping cars.

Designed and constructed by Lummus Co., the new plant went on stream producing coke almost exactly 1 year after the contract was signed.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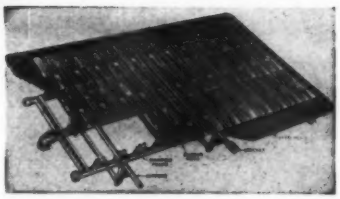

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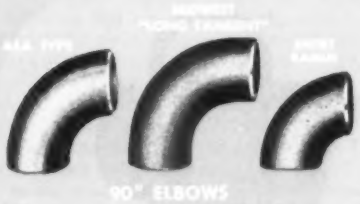

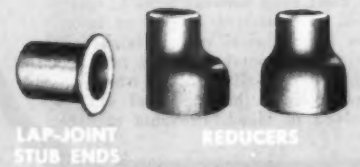

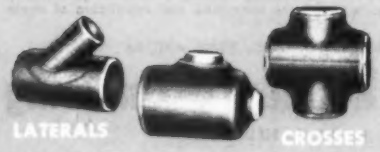

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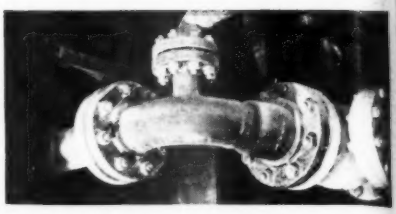

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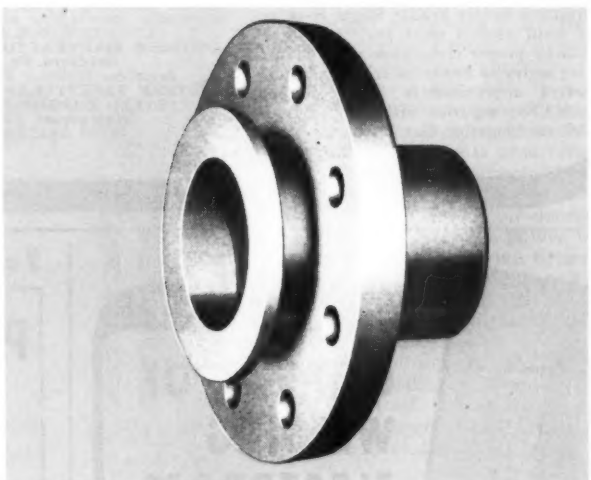

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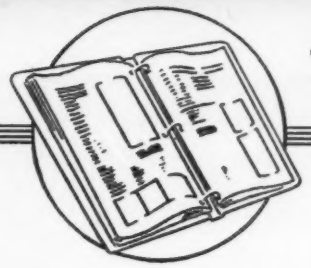

THE REFINER'S notebook

Graphic Instrumentation*—1

IN principle, the components which go to make up a graphic system are similar to the conventional instruments which have been used by most industries for years. The actual pieces of equipment are shown schematically in Fig. 1. They are as follows: (1) a pneumatic transmitter, (2) a "blind" (nonindicating, nonrecording) receiver-controller, (3) an indicating (board mounted) graphic-type control station embodying the manual-automatic transfer switch, (4) a multipoint pneumatic recorder, and (5) a diaphragm control valve.

The recently developed recording graphic-control station is now being used on the Standard Oil Co. (Ohio) newest graphic panel. This will minimize the need for multipoint recorders and should provide a better operating trend picture.

We have found that the mercuryless transmitter with a blind controller mounted at the process generally results in more stable flow control. Where pulsating flows are encountered, the conventional mercury manometer has been preferable. A schematic piping arrangement for this type of installation is shown in Fig. 2.

We have used the force balance transmitter with a blind controller mounted behind the board for measuring many temperatures below 500° F. Essential operating temperatures have been checked and indicated or recorded on multipoint potentiometers. For temperatures above 500° F. or those subject to demands of extreme accuracy and sensitivity, we prefer to use recording electronic potentiometer controllers.

In practically all cases we have brought level indications to the board as an aid to the operator. Where control is accomplished from the board, this has been done by using an arrangement similar to that shown in the schematic diagram. Where the controller is of a local type, we have used the output air as a level signal to a board indicator. A dual pilot level transmitter or equivalent is advisable if a narrow proportional band is required in the level controller. This will provide the desired control and a satisfactory level indication.

In all pressure-control applications, we have found the hookup shown in the schematic arrangement satisfactory.

To facilitate controller adjustment and maintenance, we have provided quick coupling connections in the transmitted and controlled air lines for a portable test recorder. These have been located centrally behind the board to avoid interference with the operator. They have been of great value in establishing controller settings and trouble shooting the system. The recorder itself has a two-speed chart drive to show trends in the shortest possible time or during a 24-hour period.

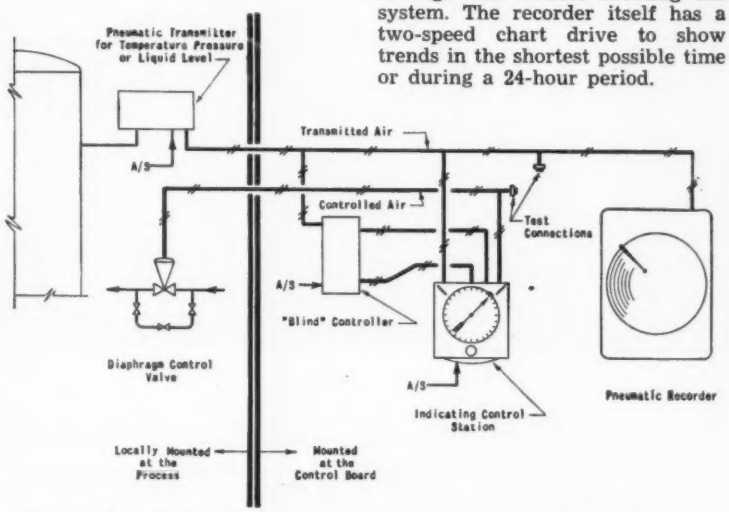

Fig. 1—Schematic diagram for temperature, pressure, or liquid-level instruments.

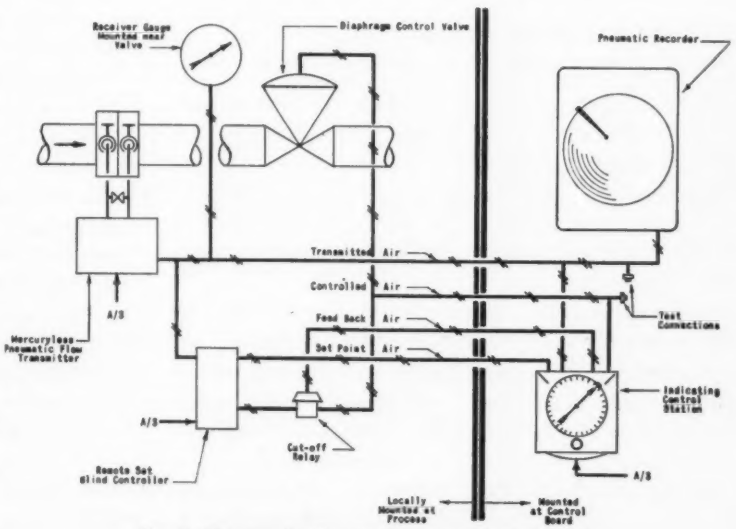

Fig. 2—Diagram for flow instruments with remote set.

*Portion of paper, "Graphic Instrumentation—A New Tool for Industry," by W. S. Bowers, Standard Oil Co. (Ohio), presented at 1950 meeting of Instrument Society of America, Buffalo.

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ENGINEERING fundamentals

No. 422

Gas-Cap Expansion and Calculation

THE expansion of a gas cap so as to maintain complete segregation between gas and oil can be viewed as one of the limits of producing a reservoir.

The reservoir is considered as a tank having an oil zone which is being continually depleted but the level of which continues to fall as the oil is produced from the base of the reservoir. The gas cap expands as oil is withdrawn and the reservoir pressure falls. No gas is considered to be produced from the gas cap and all the gas produced with the oil is assumed to be that in the oil zone. For simplicity no reinjection is considered. (Situation is shown in Fig. 1).

These assumptions amount to taking a solution-gas-drive reservoir which continually shrinks as it produces. The shrinkage has the effect of maintaining the oil saturation in the reservoir, as it depletes, higher than it would be under no shrinkage. The resulting gas-oil-ratio curve will consequently be lower. This statement is based on the assumption that in the process of shrinkage there are none of the reservoir fluids bypassed. Furthermore, it would be of little consequence whether the shrinkage of the reservoir were due to gas cap extension or water drive, so long as bypassing conditions were the same.

The condition in Fig. 1 can be analyzed, therefore, by treating the reservoir history as a modified material balance for a solution-gas-drive reservoir. The equation for reservoir with gas cap, no water drive, and no gas reinjection is:

$$N\,(u - u_o + m\,u_o\,[v - v_o]/v_o) = \Delta N\,[u + (R_c - r_o)\,v] \qquad (1)$$

This equation is solved for the gas produced, ΔNR_c. It is evaluated at two different times, the equations are subtracted to give the gas produced over a time interval, and the result is set equal to the expression for gas produced during the interval by the product of gas-oil ratio and cumulative production:

$$\text{Gas produced during interval} = R_{avg}\,(\Delta N_2 - \Delta N_1)$$

$$= N\,(u_2 - u_o)/v_2 - N\,(u_1 - u_o)/v_1 - \Delta N_2 u_2/v_2 + \Delta N_1 u_1/v_1 + (\Delta N_2 - \Delta N_1) r_o + N\,m u_o\,(1/v_1 - 1/v_2) \qquad (2)$$

In using this equation to estimate history of the solution-gas-drive reservoir, it will be recalled (Engineering Fundamentals No. 348) that auxiliary equations for the reservoir oil saturation and the producing gas-oil ratio were necessary. The reservoir-oil saturation in that case was computed on the basis that all the remaining oil was still in the same reservoir pore space as at the start of depletion. In the case under discussion, however, the oil zone is said to be continually shrinking. It shrinks by whatever amount the gas cap expands. In the former analysis with a gas cap present, the gas cap gas was assumed to diffuse through the oil zone, which maintained its original boundaries.

The oil saturation for this new case is found by evaluating the gas cap expansion. This is the volume at any time less the original volume. The latter is expressed as $Nm\beta_o$, and the former as $Nm\beta_o v_2/v_o$. Thus, the change in gas cap volume is:

$$Nm\beta_o\,(v_2 - v_o)/v_o \qquad (3)$$

This represents only gas-saturated space. The equivalent pore space, assuming no oil content in the gas cap, is found by dividing this expression by the gas saturation, $(1 - S_w)$.

The original oil content of the oil zone was $N\beta_o$, and the equivalent pore space would be this expression divided by $(1 - S_w)$ assuming no free gas in the oil zone originally. Consequently, the pore space occupied by oil zone at any time during depletion is:

$$N\beta_o/(1 - S_w)\;[1 - m\,(v_2 - v_o)/v_o] \qquad (4)$$

Not all of this pore space is occupied by oil after depletion starts. The amount of oil remaining in the oil zone is $(N - \Delta N)\,\beta$. The oil saturation is this oil volume divided by the pore space which it occupies:

$$S_o = (1 - \Delta N/N)\,(1 - S_w)\,(\beta/\beta_o)\,[1/1 - m\,(v_2 - v_o)/v_o] \qquad (5)$$

From this equation it is seen that as the gas cap expands (larger values of v_2), the oil saturation will tend to be higher than it would if there were no expansion (last term would then be missing from equation).

Equation 2 can now be evaluated to give values of P_2, R_2, and ΔN_2 for the special case under consideration. The evaluation is performed by estimating R_{avg} and solving for ΔN_2 at a given value of P_2. This value of ΔN_2 can then be used in Equation 5 to find the oil saturation, which in turn can be used to evaluate relative permeability ratio for a gas-oil ratio calculation by the familiar equation. This in turn permits a more accurate estimation of the average gas-oil ratio and the process is repeated, each successive estimation approaching nearer to true value of ΔN_2.

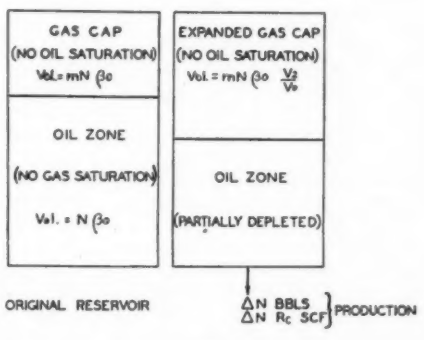

Fig. 1

Series by Dr. John C. Calhoun, Jr., Chairman, Petroleum Engineering School, Penn State College

QUESTIONS on TECHNOLOGY

by W. L. Nelson
Consulting Engineer

More on Crankcase Explosions

Note: The following discussion of crankcase explosions was called to our attention after our item of June 1, 1950, p. 84, entitled "Safeguards Against Crankcase Explosions." It contains so many good points that it is printed here. (From the July 1950 issue of Lubrication—The Texas Co.)

It is well known that crankcase explosions can and do occur in practically all types of internal-combustion engines. In smaller engines, because of the small size of the crankcase, this problem is not too important inasmuch as the force developed as a result of an explosion is generally insufficient to cause any major damage. In larger engines with their much larger crankcases, however, the force of an explosion is multiplied many times and serious damage to engine, property, and operating personnel has often occurred.

A study of available information on crankcase explosions reveals that, in all cases, explosions are caused by ignition of vapors in the crankcase by one or more overheated engine parts or flame torching past a piston assembly. The crankcase atmosphere of an engine operating under normal conditions consists primarily of air prolifically charged with globules of oil of many different particle sizes ranging from large to microscopic droplets. Under these conditions, there is no appreciable quantity of oil vapor present inasmuch as the vapor pressure of any crankcase oil at 150°-200° F. is only of the order of 5-10 μ. At the flash point temperature of the oil, 375°-450° F., there can be no more than approximately 1 per cent oil vapor present in the crankcase atmosphere.

In the event a hot spot develops within the confines of an engine crankcase, its temperature being above the spontaneous ignition temperature of the oil in use, the oil particles in the vicinity of the hot spot will vaporize and may form an inflammable mixture that could spontaneously ignite to cause an explosion. Similarly, if the oil particles come in contact with an open flame, ignition can occur which may propagate throughout the mixture.

Investigations have shown no appreciable effect of lubricating-oil type or viscosity on crankcase explosions. Accordingly, changing from one oil to another will accomplish little in the way of preventing their occurrence. A number of operating and maintenance items, however, do have a bearing on the matter, and there is a possibility of alleviation or perhaps elimination of explosions by carefully studying their relationships with the problem.

It is generally recognized that the minimum hot-spot temperature required for initiating explosions increases very rapidly under lean-mixture conditions, i.e., a high ratio of crankcase ventilating air to oil droplets. As a matter of fact, after reaching and going beyond the lean limit of combustion, it is not possible for an explosion to take place no matter how high the temperature may go. Likewise, it is known that a similar situation exists beyond the rich end of the inflammable range. The huge quantities of air required to provide a mixture too lean to burn along with the probability of richer pockets being present at various points throughout the crankcase, indicate that endeavoring to prevent crankcase explosions by this procedure is not very sound from a practical standpoint. There may be cases, however, where it might be possible to operate in the overrich range by suitable reduction or complete elimination of crankcase ventilating air. Certainly it would seem desirable for operators of existing equipment to exclude air from entering the crankcase wherever possible or practicable.

Other Investigations

Limited investigations have indicated that it might be possible to reduce the chance of a crankcase explosion occurring by lowering the temperature of the crankcase oil and, in particular, that of the crankcase atmosphere. How much can be accomplished by this line of approach is open to question. If consideration is given to its trial, it should be done with the realization that factors adversely affecting lubrication may be introduced. These include formation of low-temperature sludge in the crankcase, reduction in oil filter efficiency, and possible impairment of lubrication.

A third method of attack that might be considered is the possibility of directing oil throwoff and splash, insofar as possible, away from striking surfaces which, from experience, are apt to become overheated. Such an approach obviously involves rather drastic baffling and other devices, and their design would have to be worked out in some detail for each particular installation. In any such undertaking, the fact that suitable quantities of oil must be directed to all sliding surfaces, for obvious reasons, should not be overlooked.

Another feature of crankcase explosions which deserves careful scrutiny is the fact that there is a definite, measurable interval between the time when an engine part begins to overheat, or a flame begins to burn through a piston or between the piston and cylinder wall, and when an explosion actually occurs. Scoring of a piston and/or cylinder wall, for example, may proceed for 2, 3, or more hours of operation before one or more surfaces become hot enough to cause ignition of the crankcase atmosphere. This suggests the possibility of using devices for measuring changes in temperature, crankcase pressure, crankcase air flow, etc., installed in such a way as to automatically shut down an engine when variations exceed safe limits.

Protection of Asphalt Tanks From Fire

We do not know about petroleum refining but we are storing asphalt. What precautions against fire should we take?—F. M. T.

Although asphalt is not highly inflammable compared with many petroleum products, it presents some unusually difficult fire-protection situations. Precautions have been well outlined in the March 1950 issue of the Factory Mutual Record (a publication of the Factory Mutual Engineering Division of the Associated Factory Mutual Fire Insurance Companies, Boston).

Process temperatures are near the flash point and the asphalt can ignite readily, making an intense, destructive fire. Under some conditions, extinguishing agents cause the heated asphalt to foam over, spreading the fire. On cooling, the spilled asphalt hardens into a solid mass that must be dug out, a long, tedious job during which the process is usually out of production.

Preventing fires in asphalt tanks is largely a matter of preventing overheating. Automatic temperature controls are necessary, as well as high-temperature limit switches arranged to shut off the heat or sound an alarm.

Portable extinguishers recommended for asphalt fires are the dry chemical type. Fixed extinguishing systems are also needed under ventilating hoods at open tanks, either water spray or foam applied from overhead nozzles, but such installations must be carefully engineered. The building itself should have automatic sprinklers to protect it in case of fire in the tank.

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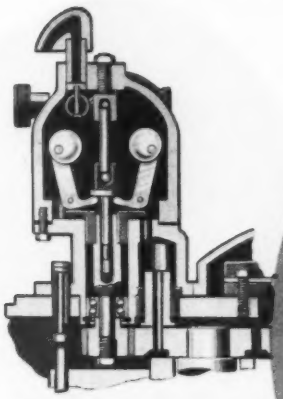
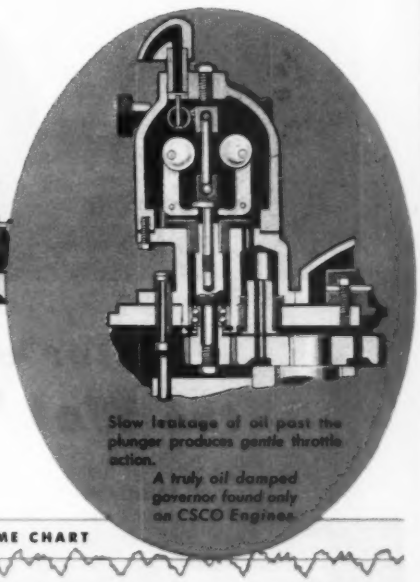


Section of governor showing oil trapped under plunger in closed throttle position. This prevents sudden opening of throttle.



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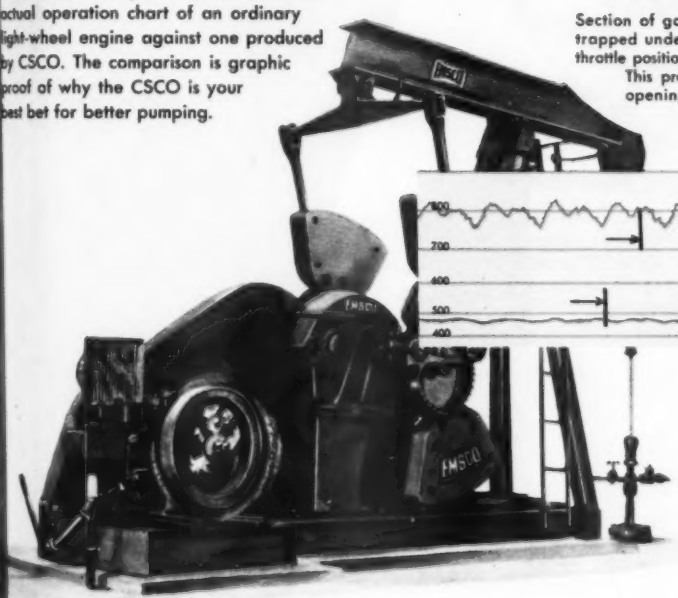

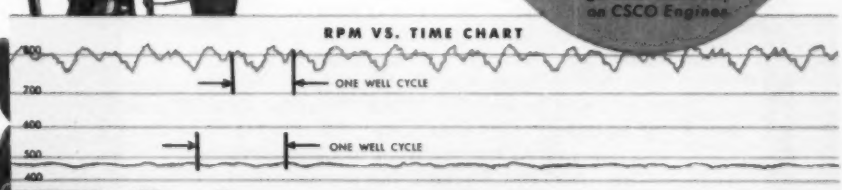

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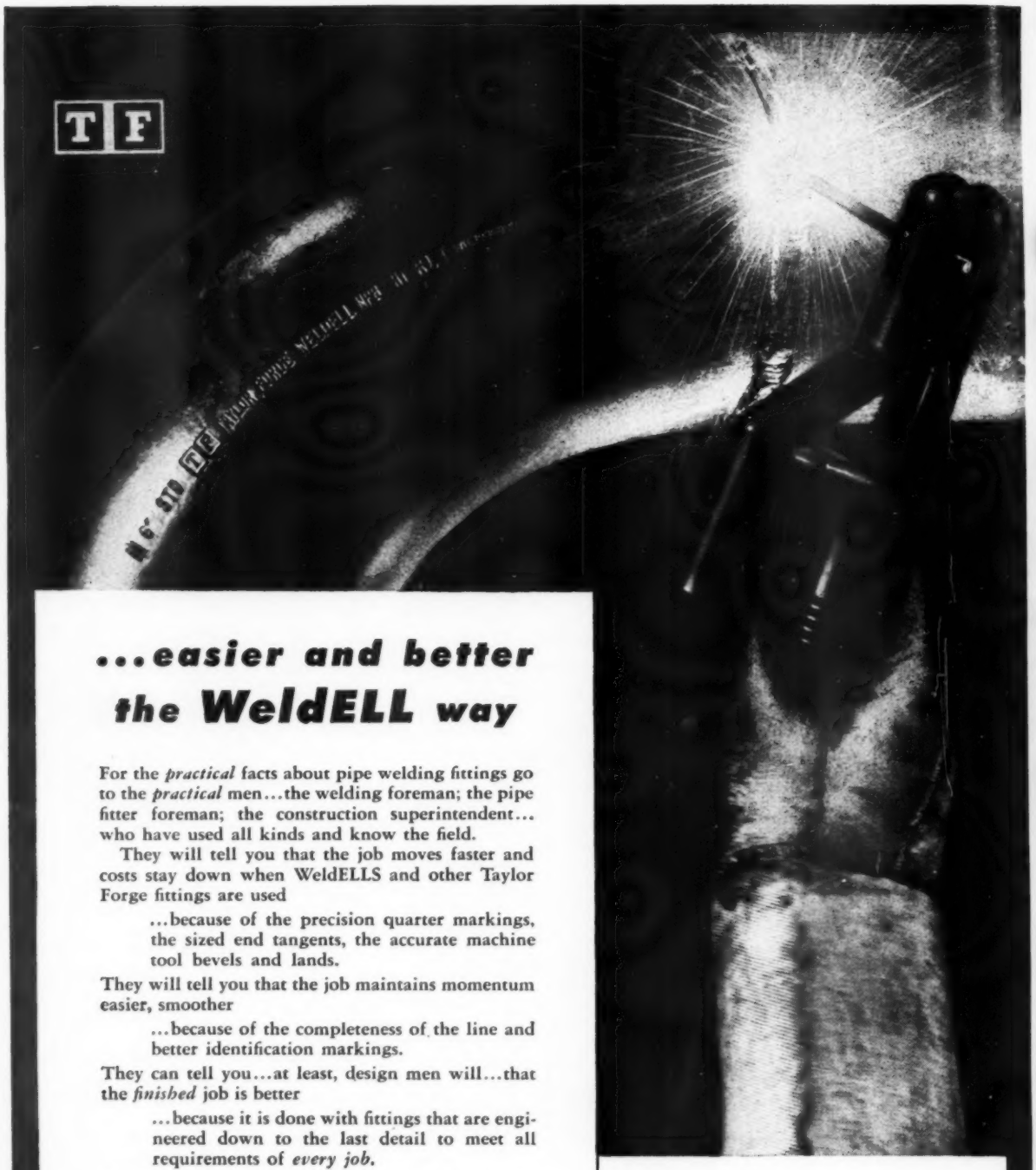

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41 42 43 44 45 46 47 48 49 50

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Corresponding to new equipment items or trade literature abstracts in the Oil and Gas Equipment Digest of The Oil and Gas Journal, Oct. 26, 1950

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OIL AND GAS EQUIPMENT Digest NEWS CIRCUIT

11 PUMP CATALOG P-10. In addition to illustrating and describing a great variety of pumps, this book records case histories of dewatering, pressure, and electric pumps and well point systems. Several pages of the multicolor catalog are devoted to data required for pump selection. *Jaeger Machine Co.*

12 CORROSION - RESISTANT VALVES. Technical information bulletin No. 5 describes Aloyco Teflon seated valves for 150 to 3,000-lb. service. The No. 62½ needle valve in sizes from ¼ to 1 in. and the 66½ plug gate valve in sizes from ⅛ to ½ in. are featured. *Alloy Steel Products Co., Inc.*

13 P-11 PORTABLE SEISMOGRAPH illustrates the portability of a complete seismograph unit designed to be carried on back packs to any location that a man can go. Each unit is the correct size and weight to fit comfortably on a back pack. Five men can carry a complete, 12-trace unit. *Southwestern Industrial Electronic Co.*

14 STEAM CONDENSERS. This 24-page, 2-color book is divided into sections dealing with installation, engineering, air - removal equipment, maintenance, and specialties. *Condenser Service & Engineering Co., Inc.*

15 CENTRIFUGAL PUMP GUIDE. Economical pumping units for industry are cataloged in a new 16-page handy guide to selection of centrifugal pumps, including close-coupled, pedestal, double - suction single - stage, multistage, self-priming, fractional-horsepower, coolant and circulating, fire, process, solids-handling, marine, rubber-lined, axial, and mixed-flow pumps. *Allis-Chalmers Manufacturing Co.*

16 FUNDAMENTALS OF FIRE EXTINGUISHMENT is a four-page illustrated discussion of what fire is, classes of fire, and proper methods of extinguishment. This is an educational booklet on fire, suitable for distribution to fire-protection personnel. *Ansul Chemical Co.*

17 PROCESS APPLICATIONS OF HEAT EXCHANGERS. This 20-page book explains the Patterson standard line of heat-transfer equipment and its application to the petroleum, chemical, petrochemical, and process industries. It details the services available in the design and application of process equipment. *Patterson Foundry & Machine Co.*

18 SLUSH-PUMP PARTS. A color brochure of real interest to drillers announces important new developments in the design of slush-pump parts, particularly emphasizing a revolutionary new piston, the body of which need not be taken off the rod when changing rubbers; nor does the rod itself need to be disconnected at the crosshead. *MacClatchie Manufacturing Co.*

19 TECHNICAL BULLETIN NO. 2, the second in a new series of data sheets, provides engineers with factual information on beryllium copper. This publication makes available case history and technical information on Berylco 25, Berylco 20C, and investment castings. *Beryllium Corp.*

20 DUAL - CIRCULATION STEAM GENERATORS for power and process steam of super purity points out the advantages of the dual-circulating steam generator over conventional boilers. *Foster Wheeler Corp.*

21 CENTROL explains a low-voltage motor-control center that is ultimate in appearance, installation economy, space saving, flexibility, and simplified maintenance. *Nelson Electric Manufacturing Co.*

22 POWER FOR YOUR OIL-FIELD JOB, an eight-page, pictorially illustrated booklet describes diesel engines that operate on the same crude oil they pump. Contents of the brochure also cover a diesel that has pumped oil for over 12 years on a 24-hour schedule, engines that operate on natural gas, and diesel engines powering portable rigs. *Caterpillar Tractor Co.*

23 BOOKLET ON REGULATORS. A new 32-page booklet containing useful information about pilot-operated pressure and temperature regulators is illustrated with photos, charts, and tables, discusses main valves, controls, and strainers, and gives capacity and flow data as well as dimensions and weights. *Spence Engineering Co., Inc.*

FOR MORE INFORMATION . . . . use one of these cards

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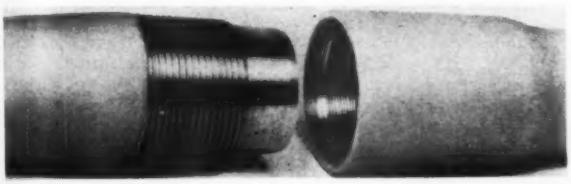
OIL AND GAS EQUIPMENT Digest

IT'S NEW CHECK IT

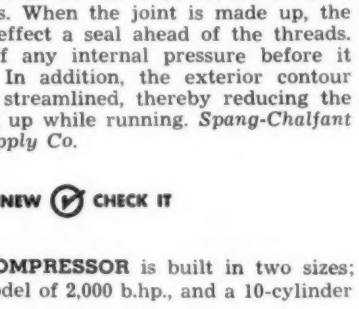
by Dan B. Miller

24 SPANGSEAL INTEGRAL JOINT TUBING. Developed chiefly to resist joint leakage, the new product consists of an integral joint equipped with the standard A.P.I. thread in conjunction with a conical sealing surface. Couplings are thus eliminated. The thread dimensions are the same as the corresponding sizes of A.P.I. external upset tubing. The conical sealing surface is located at the small end of the threaded section on both male and female ends. When the joint is made up, the two sealing surfaces effect a seal ahead of the threads. This feature seals off any internal pressure before it reaches the threads. In addition, the exterior contour of the female end is streamlined, thereby reducing the possibility of hanging up while running. *Spang-Chalfant Division, National Supply Co.*



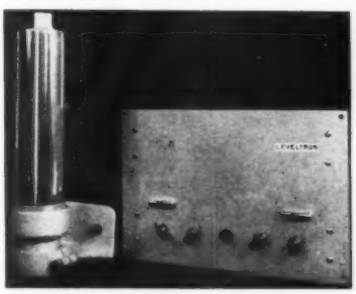
IT'S NEW CHECK IT

25 CLARK HLA COMPRESSOR is built in two sizes; an 8-cylinder model of 2,000 b.hp., and a 10-cylinder model of 2,500 b.hp. The new units, which operate at 300 r.p.m., have a bore of 17 in. and a stroke of 19 in. The HLA was developed specifically to meet the need for larger compressors with the same flexibility of compressor cylinder arrangement associated with the HBA line. It will have ready application on gas-transmission pipe lines, natural-gasoline plants, and gas utilities. In addition to a considerable saving in installation due to reduced foundation, piping, building, and field erection labor costs and lower operation cost for a given station horsepower, the operator realizes important fuel savings. *Clark Bros. Co., Inc.*



IT'S NEW CHECK IT

26 LEVELTRON is an industrial radiation instrument for liquid-level determination or control where float or gage methods are impractical. Fluid level is determined as a function of measurable gamma-ray radiation, at the outside of the vessel from a source of radiation within the fluid or floating upon the surface. Outside variation in radiation intensity is used as an indication of the fluid level. This method eliminates mechanical or electrical connections, thus eliminating potential sources of leakage and danger of electric arcing. Leveltron is constructed in two units: an explosionproof detector head installed on the tank and the remote control unit, normally installed in the control house. Two basic types are available for wide and narrow-range level control. Either type installation can furnish a limit alarm signal or an operating voltage for an electronic-pneumatic recorder-controller. This instrument is designed as an improvement over the Gagetron. *United Engineers, Inc.*



IT'S NEW CHECK IT

27 NEW LOW-PRESSURE ALARM designed to give positive warning when lube-oil pressure fails is made from sturdy cast bronze and stainless steel and will fit any make or type of engine. It gives a shrill and positive warning when the lubricating-oil pressure fails for any reason. Operation of the alarm is wholly auto-

The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.

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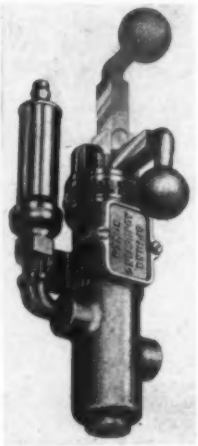
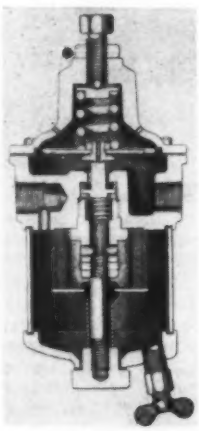


matic and the installation is extremely simple. It is easily attached to the engine block or any other convenient location and is put into operation by attaching the air line and the lube-oil pressure line to the points marked on the unit. If the lube-oil pressure fails, the piston in the cylinder is retarded enough to permit the air to pass through and operate the whistle which will sound until the lever is flipped into the vertical position. This gives the operator a simple, automatic, and positive warning. *Mid-Continent Supply Co.*

IT'S NEW CHECK IT

28 CONO AIRPAK is a combination of regulator, filter, and dripwell, in a single compact unit. Constructed entirely of brass and stainless steel, the Airpak provides maximum resistance to corrosive atmospheres. Capacity is considerably more than ordinary sets averaging approximately 25 cu. ft. per minute. Design utilizes a side-mounted drain cock permitting horizontal as well as vertical mounting without sacrifice of filter area or dripwell volume. Filter medium is phenolic resin, an impregnated cellulose capable of removing oil and water and particles down to 40μ. Airpak is available in reduced pressure ranges of 0-25, 0-50, 0-125 psig. *Conoflow Corp.*



IT'S NEW CHECK IT

29 TAPE WIPER can be readily attached to any Starrett frame-type tape and is designed to wipe the tape line clean of oil, mud, or other dirt as it is reeled in. The wiper is designed either for permanent attachment or use only on dirty jobs. It is instantly mounted on the stud which secures the hand grip to the tape frame. The wiper is of one-piece construction with no loose parts to become lost. Both sides of the tape ribbons are wiped clean by pads which are held in uniform contact under spring pressure. A bayonet lock permits the upper pad plate to be released and swung aside to facilitate pad replacement or removal of the wiper. Extra pads are supplied with the wiper. *L. S. Starrett Co.*

IT'S NEW CHECK IT

30 TORCH BURNERS. Low, medium, and high-pressure gas burners for the firing of furnaces, boilers, stills, air heaters, tanks, kettles, or ovens are available in single units up to 10 million B.t.u.'s. They may be manifolded together to obtain any rating necessary. Having no moving parts and obtaining their ratings on low draft conditions, they are ideally suited for upshot and inshot applications. Burner cage offers control of secondary air and is fitted with openings for flame-failure equipment and pilot. Burners may be had with or without the refractory block and flame retaining nozzles are used on high-pressure series. *Southwest Industrial Heating Engineers.*

IT'S NEW CHECK IT

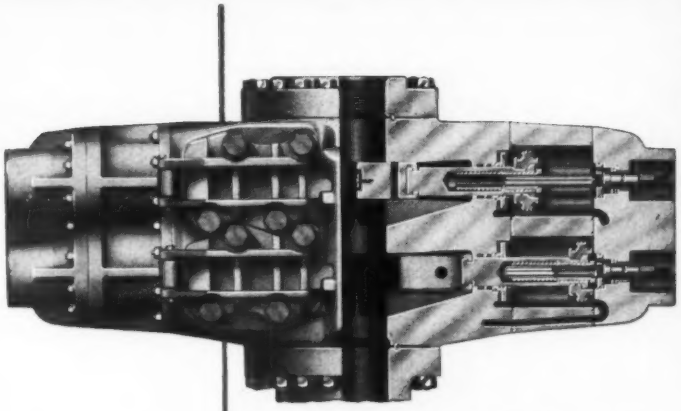
31 PACKAGED STAINLESS-STEEL SHIM STOCK. Attractively packaged in a dispenser-type box, new line of packaged stainless-steel shim stock is available in a new cello-wrapped carton. The selection of material found to be best suited for its intended uses has resulted in the choice of mirror bright, type 302 spring-temper stainless steel. A wide selection of sizes included in the line are from paper-thin .001 to .031 in. in thickness and the standard size selected is 6 by 50 in. *Precision Steel Warehouse, Inc.*

IT'S NEW CHECK IT

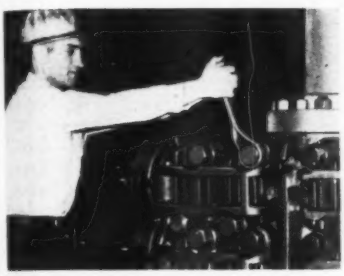
32 NEW SOLID FRONT ACRAGAGE is a solid-front type of gage case incorporating a solid cast web backing up the dial, with the entire back of the case covered by a waterproof, blow-out disk with bonded buna N seal. In the event of bourdon-type rupture the blow-out disk relieves the pressure in the case. Removal of the waterproof disk exposes the entire mechanism without removing the dial. Acragage is available in a full range of sizes from 4½ through 10-in. in both surface-mounting and flush-mounting designs. It is available with all types of bourdon

Only 4 easy steps to change rams

in the NEW SHAFFER HYDRAULIC CELLAR CONTROL GATES

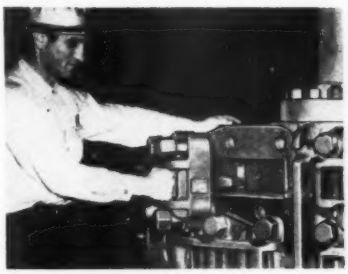


Note in this sectional view how two separate ram compartments are unitized into one compact body in the Shaffer Hydraulic Cellar Control Gate. Also note the steeply-sloped self-draining bottoms of the ram compartments . . . the direct hydraulic drive . . . and the completely enclosed design with no exterior operating parts to become jammed, damaged or corroded.



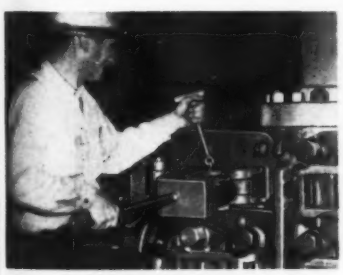
1 Unbolt two doors

in the side of the Gate. You don't even have to remove the bolts—they remain in the doors where they can't become lost.



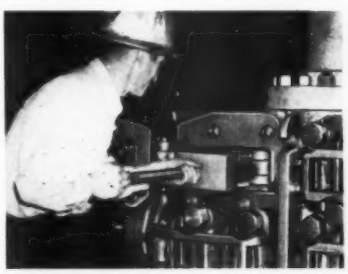
2 Swing the doors open

and pull out the ram assembly. There is nothing to loosen, unlock or disengage. The complete ram assembly slides right out.



3 Lift the rams

from the Gate and simply replace the ram blocks and rubbers with others of the desired size—a quick, simple operation.



4 Slide the ram assembly

back into the Gate, close and bolt the doors. Closing the doors automatically aligns the ram assemblies within the Gate.

With the Shaffer Hydraulic Cellar Control Gate you can make ram changes faster and simpler than in *any other* cellar control gate. And—equally important—you can make a complete ram change *whether the pipe is in or out of the hole!*

And remember this—unusual speed and simplicity of changing rams is only one of *many* vitally important advantages Shaffer engineers—pioneers in the development of high-pressure control equipment—have incorporated into Shaffer Hydraulic Cellar Control Gates. Check over the additional features outlined at right, and then get the *complete* story on these advanced Gates before you buy *any* cellar control gate equipment. No other equipment provides so much protection—in so small a space—with so many far-reaching advancements!

CHECK OVER THESE UNIQUE FEATURES, TOO!

- **UNUSUAL COMPACTNESS:** Although *two* separate ram compartments are unitized into *one* body, the overall height of the Gate, including both compartments, is only 30" in sizes as large as 13⅜" (12" Series 900). Smaller sizes are even more compact!
- **QUICK DRAINING BODY:** Note in sectional view above how the rams travel on high narrow guide ribs above the steeply-sloped bottoms of the ram compartments. Mud and sand quickly drain back into the well—no detrimental accumulations to interfere with free ram travel!
- **DIRECT HYDRAULIC DRIVE:** Also note in the view above how the hydraulic operating cylinders are directly *behind* the rams for positive action, maximum simplicity, greatest safety. There are no secondary connections between hydraulic cylinders and rams!
- **COMPLETELY ENCLOSED DESIGN:** All moving parts—even the piston rod ram shafts—are completely enclosed within the body of the Gate. There is nothing to become wedged or damaged by objects falling into the cellar—nothing to become corroded by chemical and mud drippings. Even the locking shaft is non-rising—fully protected!

And there are still other important features—all combining to make the Shaffer Hydraulic Cellar Control Gate the most advanced hydraulic gate available today. Get full details from your Shaffer representative—or write direct.

Write for your copy of the 1950 Shaffer Catalog that gives full information on Shaffer Hydraulic Cellar Control Gates and other Shaffer products.

See pages 4433 to 4496 of your 1950 Composite Catalog!

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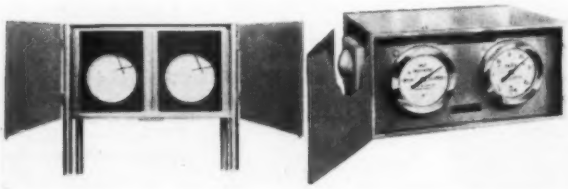
tubes, for ranges from 30-in. vacuum to 80,000-lb. pressure. *Clapp Instrument Co.*

IT'S NEW CHECK IT

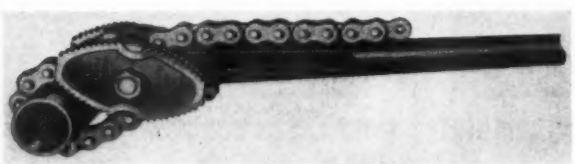
33 MUD-FLOW MEASURING SYSTEM consists of two measuring and two indicating or recording instruments. The mud-pit level gage is located in the mud pit near the suction intake. This mechanism is operated by a counterbalanced steel float. The mud-flow indicator is attached to the end of the mud-return outflow pipe, and has its own transmitting mechanism. As the flow of



mud returned to the pit varies, a gate overhanging the end of the pipe transmits this measurement to the receivers. The visual indicator and alarm is mounted on the drilling floor, where the driller can see at a glance the condition in the mud pit and at the mud-return outlet. One set of receivers is directly connected to the transmitter in the mud-pit level gage, and the other to the transmitter at the mud-flow indicator. Each of these units keeps a permanent record on a 24-hour chart. *Shand & Jurs Co.*

IT'S NEW CHECK IT

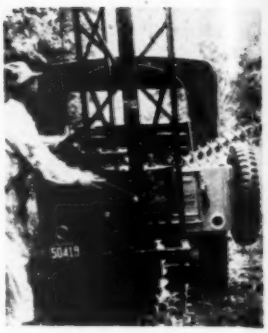
34 VULCAN REVERSIBLE PIPE TONGS. Without removing the tongs or loosening the chain, reversible tongs will turn pipe in either direction. Since removal



of the tongs is unnecessary, no time is lost in reversing the action. Outer jaws can be removed to make an efficient fittings tongs for narrow beads and flanges. Jaw removal is accomplished by taking out the single standard bolt and nut used in assembly. These outer jaws are also reversible end for end providing double life. Available in four sizes for pipe and fittings from ¼ to 8 in. *J. H. Williams & Co.*

IT'S NEW CHECK IT

35 MOBILE DRILL. Designed for mounting on the Universal Jeep, this equipment will drill a 4-in. hole 100 ft. deep, either vertically or horizontally. A sturdy, 7-ft., 4-in. steel tower is low enough to permit passage of the Mobile drill under bridges. The drill boom can be moved from vertical to horizontal in 5 minutes. Equipment mounts on the rear end of the Universal Jeep and obtains power from the rear power takeoff. The Jeep's hydraulic system provides leverage for raising and lowering the drill boom. *Willys-Overland Motors, Inc.*

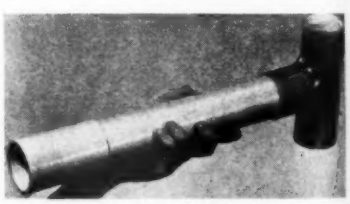


IT'S NEW CHECK IT

36 NEW POWER CHUCK. A new air-operated power chuck has scroll-type, universal adjustment for pipe size, and uses a universal cam-operated gripping action. The chuck can be operated without stopping the machine arbor, and it operates on a small quantity of low-pressure air. This chuck is completely self-contained, with the air cylinder integral. *John Ramming Machine Co.*

IT'S NEW CHECK IT

37 GLASWELD. This new product has the strength of steel and is rust and corrosionproof. It is now available as piping in the oil and chemical-processing industry. Glasweld is a laminated tubing in which glass fibers, in the form of cloth, mat, or tape, are bonded with resins to develop a rugged tube impervious to extreme heat, chemical action, and sledge-hammer blows. *United States Plywood Corp.*

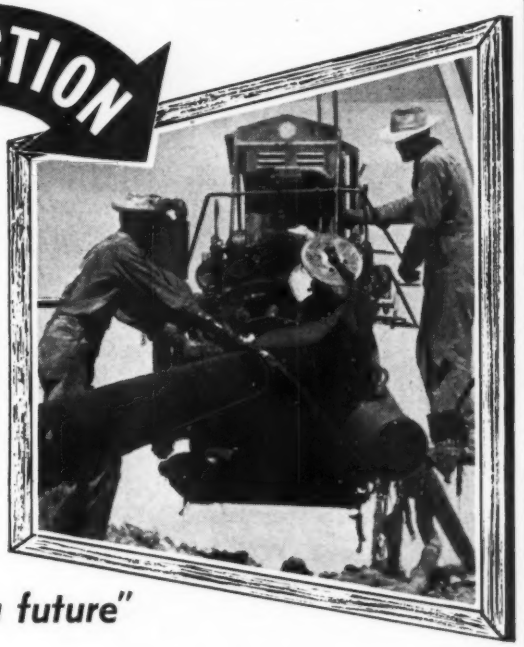


IT'S NEW CHECK IT

38 DAVIS VAPOTESTER MODEL M-1, TYPE L, cannot be poisoned by tetraethyl lead. It operates on the principle of the Wheatstone Bridge. Two legs are identical interchangeable filaments. The analyzing filament is exposed to the gas or vapor sample, and the reference filament is sealed in air. The other two legs are fixed resistors whose resistance is increased by the gas or vapor burning on the analyzing filament. This causes a flow of current through the meter. It is ideally suited for determining the gas-free condition of tanks and other enclosed vessels used in the oil industry. The indicator registers accurately the relatively light concentrations of vapors present after the tank has been steamed and ventilated, and is unaffected by the tetraethyl lead vapor. *Davis Emergency Equipment Co.*

IT'S NEW CHECK IT

PORTRAIT OF PROTECTION



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Burial tests, begun in 1930 by the Bureau of Standards and the API, showed the value of Asbestos Pipe Line Felt in protecting coatings of underground pipe.

Asbestos Pipe Line Felt protects the coating from distortion due to soil stress, minimizes backfill and lowering-in damage, and prevents abrasive wearing of the coating due to pipe movement.

GAMA Asbestos Pipe Line Felt is an inorganic shield for the enamel insulation. This means that damage to the coating and pipe is stopped on the outside—*before it starts.* GAMA Felt is saturated with the same basic bitumens as the coating.

GAMA Asbestos Pipe Line Felt is made to AWWA specifications, but can be made to your particular specifications.

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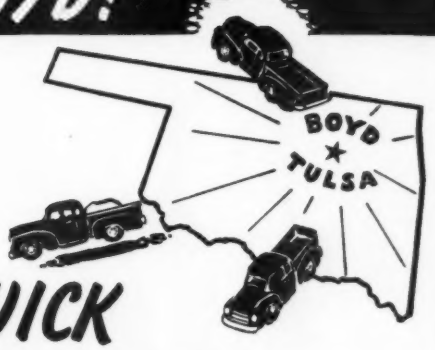

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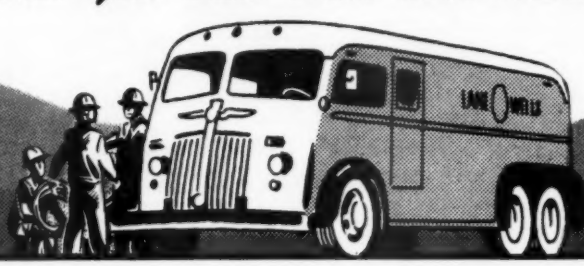

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Among the Drilling Contractors

New Drilling Company

Organization of a new drilling company, Capitt Drilling, Inc., has been announced by C. A. Prichard, Oklahoma City, president. Associated with Prichard are J. M. Clampitt, vice president, and Les Clampitt, secretary-treasurer and manager. Headquarters are at Wichita, Kans.

Number of Active Rigs Nears All-Time Peak

Continued increases in the number of operating rotary rigs in the United States and Western Canada boosted the total during the week ended October 16 (latest survey) to within 4 of equalling the all-time record "high," reached during the week ended November 22, 1949.

Active rigs in the latest survey totalled 2,453, an increase of 67 over the number reported during the preceding week, At the all-time peak of drilling activity recorded during November 1949, the total climbed to 2,457. The current total represents an increase of more than 150 rigs in a month's time.

Of the total during the current reported week, 2,347 rigs were in the United States, where the number lacked 34 rigs of equalling the all-time peak for that region.

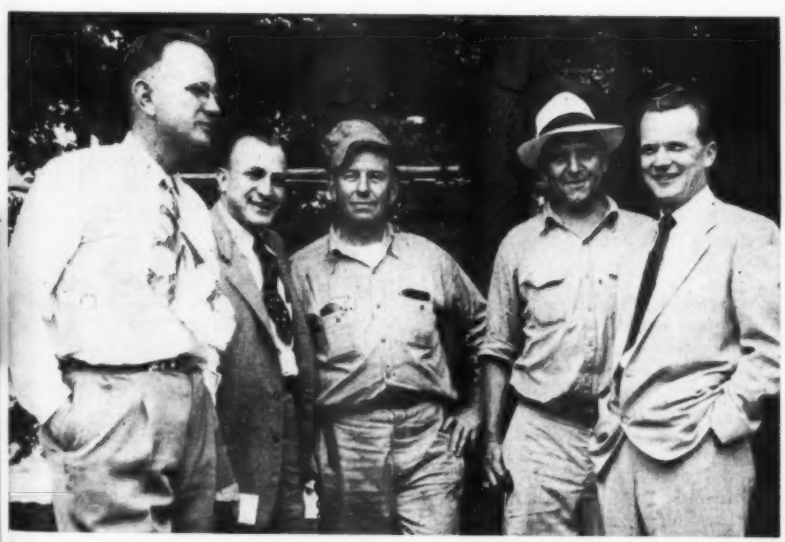
The West Texas-New Mexico total of 814 rigs reported during that week was a new "high" for the area. It exceeded the previous week's record total for the area by 32 rigs. Increases in activity were noted in all areas except Arkansas - North Louisiana-East Texas, Oklahoma and the Pacific Coast.

ROTARY RIGS IN OPERATION*
(United States and Western Canada)

Area—	week ended 10-16-50	Change week ended 10-9-50	Change week ended 10-17-49
Gulf Coast	535	+12	+ 40
W. Tex.-N. M.	814	+32	+208
Ark.-N. La.-E. Tex.	141	— 1	— 20
Oklahoma	287	0	+ 57
Kansas-Nebraska	142	+11	+ 23
Illinois-Eastern	165	+ 9	+ 56
Rocky Mountains	125	+ 6	+ 14
Pacific Coast	138	— 2	— 9
Total U. S.	2,347	+67	+369
Western Canada	106	+ 4	+ 47
Total	2,453	+71	+416

*Courtesy Hughes Tool Co. Trends in drilling activity in the United States and the Rocky Mountain and Western Canada area are shown by charts on pages 160 and 161.

Standard-Fryer Drilling Co., Dallas, is moving in a rig for a 10,500-ft. wildcat test which it will drill as a part owner with C. A. White and associates in 26-CB-C&N Survey in southwestern Lubbock County. The test, 1 Bidwell, will explore the Pennsylvanian section. Location is 6½



Ed E. Hess (second from right) and his toolpusher, Walter Rinehart (center), pose with Dick Allen (left), general manager, Well Service, Inc., and E. C. Petsinger (second from left) and W. A. Husing (right), Peoples Natural Gas Co., on one of the contractor's rigs being used in cleaning out old gas wells in the Oakford field, Westmoreland County, Pennsylvania. The wells will be used for gas storage purposes.

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miles east of the Ropes Pennsylvanian field.

Fred Postelle, Odessa, Tex., is drilling for Westbrook Oil Corp. at 1 Baugh, a projected 6,000-ft. wildcat test in 8-M-GH&SA Survey, 5 miles north of the Page field, in Schleicher County, West Texas.

Strain Drilling Co. is the contractor on a wildcat test which Sohio Petroleum Co. is drilling in the Wakeeney area, Trego County, Kansas. Location, in the NE NE NE 25-11-22, is 7 miles from nearest production.

Lewis - Miers Drilling Co., Shreveport, has the contract for a 5,000-ft. Woodbine test (1 Thompson) being started by C. & L. Corp in the S. Hendon Survey, 7 miles south of Rusk, southern Cherokee County, East Texas.

H & H Drilling Co., Wichita, is drilling at a wildcat location just north of the Kansas line, in Harlan County, Nebraska, where it has a contract with W. L. Hartman and American Plains Oil Co. for a Lansing-Kansas City lime test. Location is on the operators' Ralston lease in the NW SE NW 32-1n-17w.

Delta Gulf Drilling Co., Dallas, is moving a rig to a wildcat location 25 miles southwest of Ozona in Crockett County, West Texas, where it will drill an Ellenburger test for its own account on a farmout obtained from Shell Oil Co. Location is for 1 Dock in Section 14, John H. Gibson Survey. Hole is projected to 10,500 ft.

Milton Crow, Inc., Shreveport, has the contract for a wildcat test to be drilled for Nebo Oil Co. near Sparta, Bienville Parish, North Louisiana. Location, on the Colbert lease, is in 15-16n-7w.

Hunter Brothers Drilling Co., Wichita Falls, Tex., is drilling Ohio Oil Co. 1 Abercrombie, a 5,000-ft. wildcat test located in Block 158, John Harris Subdivision, 2 miles soupthwest of Archer City, Archer County, North Texas.

Warren & Bradshaw Drilling Co., Tulsa, has moved in a rig for a 7,000-ft. wildcat test to be drilled for C. L. Carlock and Vickers Petroleum Co. at 1 Evans, in the SW SW SW 11-7s-3w, 5 miles south and 3 miles east of Orr, Love County, southern Oklahoma.

Loffland Brothers Co., Tulsa, is starting an Ellenburger test for Mar-Tex Realization Corp., Dallas, at 1 Gee, in Section 169-2, H&TC Survey, Coke County, West Texas. Location is about 7 miles from west of the Jameson Strawn field, nearest production.

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Pipe Size	Floor to Floor
½"	16 sec.
¾"	16 sec.
1"	19 sec.
2"	27 sec.
2½"	35 sec.
3"	43 sec.
4"	76 sec.

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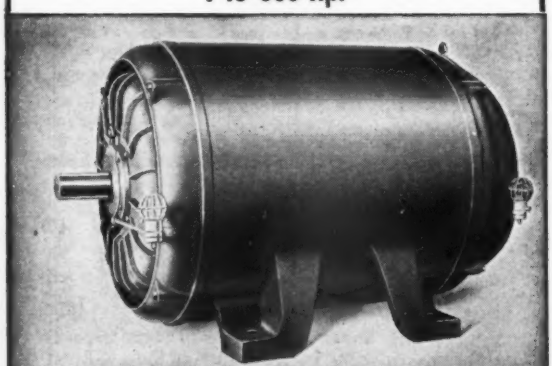

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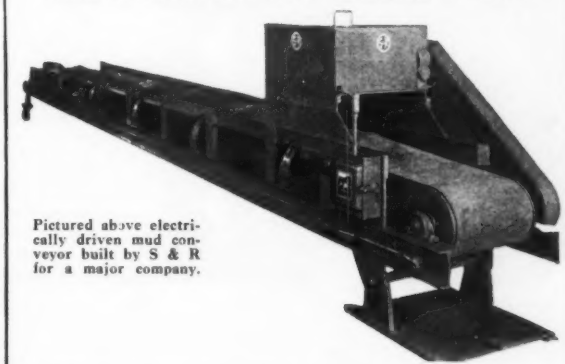

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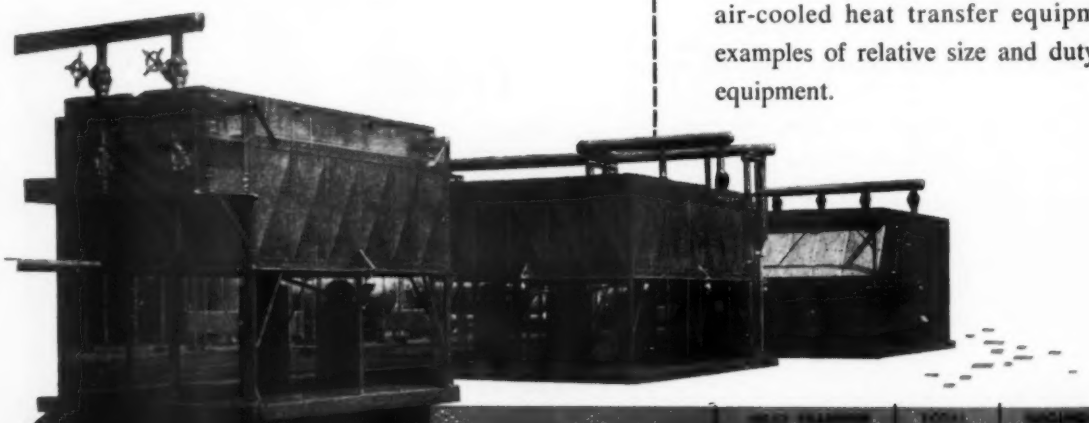

SERVICE	HEAT TRANSFERRED (BTU/HR.)	TOTAL H.P.	BUNDLE SPACE
GAS COOLING			
Natural Gas After-Cooler	13,920,000	80	46' x 25'
Manufactured Gas Cooler	11,165,000	50	23' x 21'
Natural Gas After-Cooler	3,400,000	15	11' x 21'
Natural Gas Inter-Cooler	7,890,000	40	23' x 21'
VAPOR CONDENSING			
Reflux Condenser	18,407,000	90	48' x 25'
Primary Condenser	4,652,000	40	11' x 25'
Still O.H. Condenser	4,875,000	34	16' x 21'
Debutanizer Condenser	11,930,000	60	23' x 25'
Still Reflux Condenser	39,110,000	60	46' x 25'
Steam Condenser	87,300,000	300	138' x 31'
Steam Condenser	2,880,000	10	10' x 6'
LIQUID COOLING			
Vegetable Oil Cooler	628,000	15	6' x 17'
Absorption Oil Cooler	14,915,000	100	32' x 17'
Quenching Oil Cooler	1,665,000	50	23' x 25'
Amine Solution Cooler	19,300,000	175	38' x 25'
Stabilized Crude Cooler	125,100,000	700	315' x 25'
Jacket Water	2,400,000	5.5	16' x 12'
Jacket Water	28,800,000	100	70' x 24'

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REFINING

Oil's Challenge

New sealed engine awaits petroleum improvements

WASHINGTON.—Production of large quantities of high-octane fuel at low prices for the high-compression engine of the future is the automotive industry's most important unsolved chemical problem, it was disclosed recently by Charles L. McCuen, general manager of General Motors Research Laboratories.

Speaking before the Commercial Chemical Development Association and the Chemical Market Research Association here, McCuen said the aim of the motor industry is conservation, "making three oil wells serve where we now require four." Motorists will save an average of a gallon of gasoline a day over present models when high-compression engines become generally available, he predicted.

Gasoline, however, was cited as only one of many problems which automobile makers have in the petroleum field. Also needed, McCuen said, are a good additive that will make fuel burn so there will be no carbon deposits, lubricants to withstand heavier loads, new and better hydraulic oils for automatic transmissions and torque converters, and an oil-resistant synthetic rubber capable of withstanding temperatures over a range of 440°.

"The production of large quantities of high-octane fuels poses many questions," McCuen pointed out. "Nature did not have the high-compression engine in mind when she formed petroleum in the earth. It is therefore of first importance that the chemical industry develop even better and lower cost processes of converting the hydrocarbon molecules which are in petroleum to the desirable high-octane fuel molecules. This involves the discovery of new and better catalysts for which we will depend upon the chemical industry.

"We would like you to develop an oil that would not change in viscosity from minus 60° to 300° F., that would be absolutely chemically stable under all engine operating conditions and that would have low friction characteristics. Then, provided we had fuels having clean burning characteristics, we might be able to build a sealed engine which would not require service for its life."

Taylor to Add T.C.C. Unit

TAYLOR, Tex.—Taylor Refining Co. plans to modernize its 22,500-bbl. per day Corpus Christi refinery by the addition of an 8,000 bbl. per day modified Thermofor Catalytic Cracking unit. A contract has been signed with Socony-Vacuum Oil Co., Inc., licensors of the process, and engineering work has begun on the unit design. Construction is expected to get under way before the end of this year.

The new modified T.C.C. unit is similar to the 10 units now under construction in six Socony-Vacuum refineries and one plant of Standard Oil Co. (Ohio), although its charge capacity is roughly half that of the larger units. The rated capacity of 8,000 bbl. per day of fresh feed may be augmented by about 2,000 bbl. per day of cycle stock.

New Aromatics Processes

Development of a new catalyst, and a new adsorption adaptation of silica gel were cited last week as two contributions to the current search for increasing the production of petroleum benzol by R. L. Hockley, vice president of the Davison Chemical Corp. Addressing members of the New York Society of Security Analysts, Hockley stated that the two process applications of these developments, expected to be announced commercially in the near future, are the result of cooperative work between Davison and research departments of certain oil companies.

"Currently, one of the most interesting activities in catalyst development," he said, "is one in which we have been cooperating with Atlantic Refining Co. which has resulted in the development by it of a process and the manufacture by us of a catalyst for reforming of petroleum stocks to increase the yield of higher-quality gasoline. This process and catalyst appear to have very broad applications and could have a very important part to play in helping overcome the current benzol shortage in this country. We believe that this process and the catalyst will be widely used in petroleum refining in the near future."

The other new development to which Hockley referred was a new silica gel application in the separation of petroleum stocks by adsorption. In cooperative research with two oil companies, Davison has contributed to the development of a process which will effect the sharp separation of olefins from aromatics. This technique, showing promise of application on a batch or continuous type operation, is expected to be perfected to the point where public announcement will be forthcoming soon. The stepped-up defense program, in

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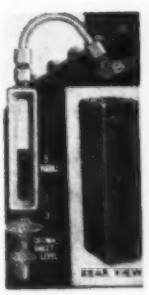

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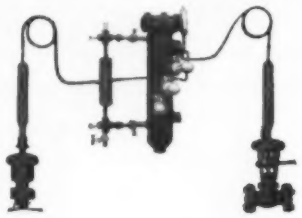

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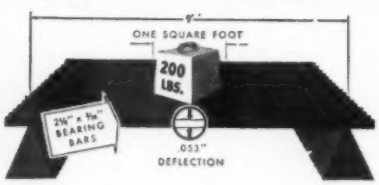

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which benzol figures prominently, has accelerated action in these types of development, and results on the specific projects mentioned are believed nearing commercial application.

Long Solvent Unit Runs

Two solvent refining units at plants of Sinclair Refining Co. have rounded out long periods of continuous operation. At the East Chicago refinery, a phenol extraction unit was recently taken out of operation for inspection and revamping after an on-stream period of 585 days. During that period starting February 18, 1949, the unit was charged with a total of 2,403,818 bbl. of oil, comprising 1,963,377 bbl. of 28° A.P.I. gravity neutral stocks, and 440,441 bbl. of 22° A.P.I. gravity residual stocks.

Modifications in the form of laminated coalescing sections of knitted stainless steel were installed in the bottom trays of the extraction column, and the entire unit was inspected for possible corrosion damage.

At the company's Houston refinery, a solvent dewaxing unit has been on stream since May 29, 1947, and operators do not expect to turn it around for several months. Up to October 1, during a total of 1,221 days, the unit had processed 4,451,943 bbl. of stock for dewaxing and deoiling. Included were 1,410,312 bbl. of heavy oils and 2,718,818 bbl. of neutrals for dewaxing and 312,698 bbl. of crystalline wax and 10,115 bbl. of petrolatum for deoiling.

N.L.G.I. Annual Meeting

CHICAGO.—The annual meeting of the National Lubricating Grease Institute, which will be held at the Edgewater Beach Hotel here October 30-November 1, has been designed to cover all aspects of the lubricating grease manufacturing and application fields.

Papers will include: "Complexes in Lubricating Oil Greases," Dr. Earl Amott and L. W. McLennan, Union Oil Co. of California; "A Plea for Uniformity in the Packaging of Lubricating Greases," L. G. Rotter, Lincoln Engineering Co.; "Multi-Purpose Grease—Economics and Human Reactions in the Automotive Field," A. C. Sommers, Richfield Oil Corp., New York City; and "Evaluation and Use of Synthetic Greases," Edward M. Glass and Bernard Rubin, Air Material Command.

Onyx to Install Platformer

ABILENE, Tex.—Capacity of the Onyx Refining Co. plant will be increased 25 per cent by construction of a Platforming unit and other expansion facilities. Present volume of 4,250 bbl. daily will advance to 5,500 bbl. of crude oil daily when installation is completed about June 1, 1951. Cost will approximate $1,000,000.

Site of the new development will be a tract of nine acres adjacent to the present refinery, 8 miles north of here. With the Platforming unit, Onyx will include a stabilization unit, a vacuum distillation unit, additional tankage, pumps, and lines to support the enlarged operation. A new thermal cracking still will also be installed.

Onyx plans to construct the new units under the direction of its own personnel. Engineering supervision will be provided by the designers of each unit.

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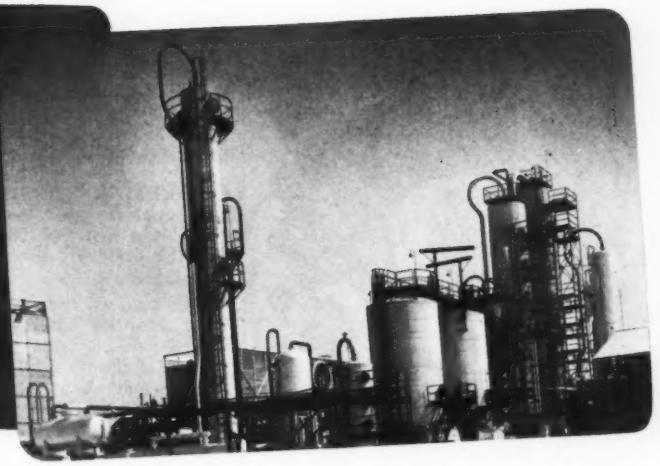

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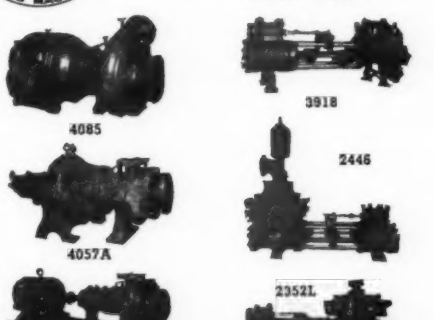

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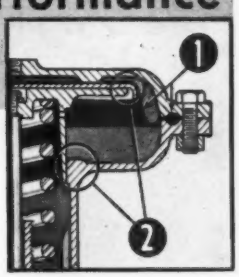

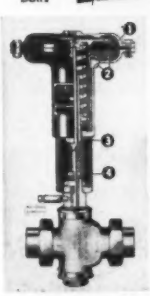

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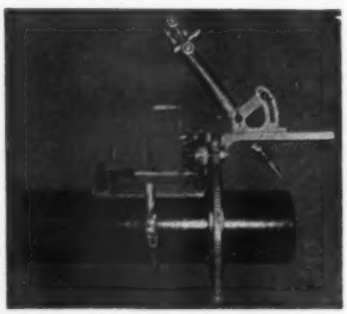

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PIPE LINES

Latex Completes Laying Job

HOUSTON. — Latex Construction Co. reported last week that it had completed work on 99 miles of 30-in. gas line for Tennessee Gas Transmission Co. in Louisiana and Arkansas.

This project included 67 miles from West Monroe to Natchitoches, La., and 32 miles from the vicinity of Eudora, Ark. W. H. Hayes was spread superintendent, and M. L. Thompson, assistant superintendent.

Other work by Latex includes:

95 miles of 20-in. gas line for Tennessee Gas from Natchitoches to Kinder, La. One spread is at Glenmora, La., with F. A. Silar, superintendent; and another spread, which previously was located at Oberlin, has completed the south 25 miles of the job and has moved on to Elton, La., to start on the 16-in. J. A. Cantrell is superintendent.

102 miles of 16-in. gas line, and 11 miles of 12-in. gas line for T.G.T. One spread, at New Iberia, La., has completed the 12-in., and 46 miles of the 16-in. at the Vermilion River. H. L. Leake was superintendent. A. second spread will start at the Vermilion with headquarters at Crowley, La. W. H. Hayes is superintendent. The third spread, under J. A. Cantrell, is located at Elton, La.

15 miles of 12-in. for T.G.T., from north of Delcambre, La., south to near Tigre Lagoon. H. L. Leake is superintendent, with headquarters at New Iberia.

10 miles of 26-in. for T.G.T. near Greenville, at the Mississippi River bridge. Work consists of land lines approaching the bridge and four lines suspended on the bridge. Remainder of pipe has just been received, and job is to be completed by October 25. H. E. Murphy is spreadman, with headquarters at Lake Village, Ark.

Two 16-in. submarine lines across the Mississippi River just below the Greenville bridge for T.G.T. Work to be resumed upon completion of Greenville bridge work, under same spread.

Pipe Line Mileage Up

WASHINGTON.—Petroleum pipe lines are nearing the total mileage of railroads, according to reports of the Interior Department. Total mileage on January 1, 1950, was 152,814 miles, representing a 20 per cent increase since May 1941. This total does not include either the Big or Little Inch pipe lines.

The largest increase was reported in lines 10 in. or more in diameter, the average size of this group being 20 in. Lines in this group registered an extension of 8,748 miles. A decrease of 2,555 miles was recorded in the lines of smaller diameter.

Texas gained more crude-oil trunkline mileage than any other state, with 3,539 miles. Kansas suffered the greatest loss with 918 miles.

An increase of 11,880 miles in refined-product trunk lines more than doubled their mileage during the period. Such lines are operating in 35 states and the District of Columbia.

El Paso Plans Building

EL PASO.—Expansion for El Paso Natural Gas Co. includes a new home office building which is estimated to cost about $2,000,000. All 15 stories of the projected structure will house the spreading offices of the transmission company. The management units are now scattered through several buildings in different areas here.

El Paso Natural is pushing construction of its pipe line to the West Coast, laying approximately 8,000 ft. of 24-in. pipe daily. The line will carry natural gas from the San Juan basin to California. The main consuming market will be the San Francisco Bay area, with service to various Arizona communities along the way.

The big artery starts at Fruitland, near Farmington, moving southwest across the Navajo Indian Reservation to a point near Window Rock, Ariz. From that point it roughly parallels U. S. Highway 66 to Topock, Ariz. Capacity of the line will be 165 million cubic feet daily.

Humble Lets Line Contract

HOUSTON.—Contract has been let by Humble Oil & Refining Co. to Trojan Construction Co., Oklahoma City, for the laying of a 50-mile, $1,000,000 gas line from Trawick field, Texas, to a point 5 miles southeast of Longview.

The 8-in. artery will supply Tennessee Eastman Corp.'s new chemical plant near Longview. It will go by way of the East Texas field and a 6-in. lateral line, 2 miles long, will be built to Humble's London gasoline plant. The company will use part of the line's capacity for its East Texas field operations.

Humble has six wells in the Trawick field producing from the Odessa zone. Capacity of the new line is rated at 38,000,000 cu. ft. daily. Construction is scheduled to be completed by the first of next year.

New West Virginia Line

WASHINGTON. — Pipe-line facilities estimated to cost $790,000 have

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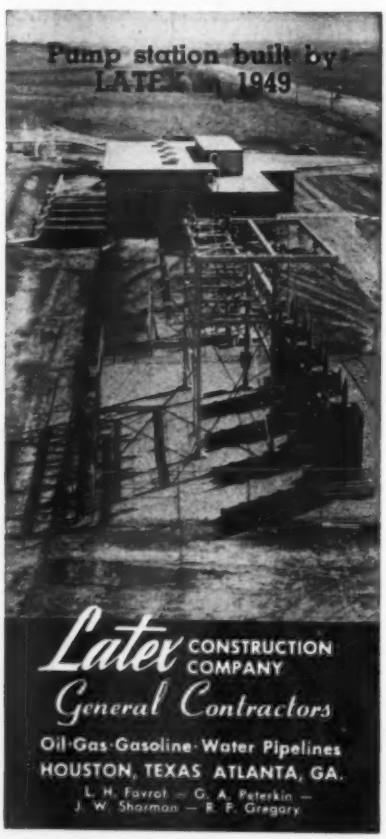

Latex CONSTRUCTION COMPANY
General Contractors
Oil·Gas·Gasoline·Water Pipelines
HOUSTON, TEXAS ATLANTA, GA.
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been authorized by the Federal Power Commission to enable Hope Natural Gas Co., Clarksburg, W. Va., to increase natural-gas deliveries into the company's Fink storage area in Lewis County, West Virginia.

The facilities will include 19½ miles of 18-in. transmission line. Increase in the pipe-line capacity daily is estimated at 100 million cubic feet of natural gas. No new markets will be served, the increase being projected to render more adequate service to the company's present customers.

Interstate to Shreveport

TULSA.—Interstate Oil Pipe Line Co. will move its corporate headquarters and executive departments from Tulsa to Shreveport. Transfer will start late in the spring and will be completed by July of next year, according to J. L. Segar, executive vice president. His own office will be moved in that period.

Executive departments such as accounting, engineering, material, and employe relations will be moved to Shreveport in order to simplify the organization through elimination of duplication. The company has been contemplating a program for the consolidation of management ever since 1944 when Interstate was formed through merging Oklahoma Pipe Line Co. with the pipe-line department of Standard Oil Co. of Louisiana. Close consideration was given to the question of whether headquarters should be centered in Tulsa or Shreveport.

The decision to establish in Shreveport was reached because Interstate activities are somewhat larger in Louisiana and Mississippi where they are growing more rapidly than the company's operations in other states. A Tulsa office will handle operations of the northern division.

Feeder Line Sale Proposed

WASHINGTON.—Proposed sale of pipe-line facilities in Texas will be the subject of a hearing scheduled for October 20 before the Federal Power Commission. Independent Natural Gas Co., Pampa, Tex., and Northern Natural Gas Co., Omaha, have made joint application for the transfer.

Bell Acquires System

TULSA.—Bell Oil & Gas Co. has purchased the gathering system of Magnolia Pipe Line Co. in the Milroy field of Stephens County, Oklahoma, which is immediately west of the system recently purchased by Bell interests from Interstate Oil Pipe Line Co. in the Fox and Graham areas. The west part of the Interstate system served part of the area covered by the Magnolia system.

Flow of oil will move east, tying

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for oil field engines

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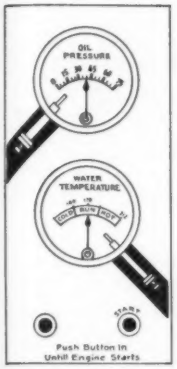
OIL LEVEL TYPE IGNITION CUT OFF SWITCH



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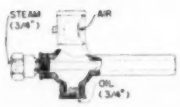

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SHREVEPORT, LA.

into Bell's new 4-in. line recently laid to tie in the Interstate system. The line is about 12 miles long and ties into the main 6-in. line going to the Ben Franklin refinery at Ardmore, Okla.

SINCE Trojan Construction Co. was organized on January 20, 1948, the firm has completed construction of 1,436 miles of pipe lines with diameters ranging from 6⅝-in. to 18-in., and has built 11 major river crossings with pipe of 8⅝-in. to 26-in. in diameter.

A. C. JOHNSON

History.—On starting in the pipe - line - construction business, Trojan purchased the assets of Al Johnson Excavations. Office and warehouse have been maintained in Oklahoma City for nearly 3 years, and during this time, the firm has been engaged in projects in Texas, Oklahoma, Kansas, Nebraska, Iowa, Missouri, Illinois, Indiana, Ohio, and Minnesota.

M. W. CRAWFORD

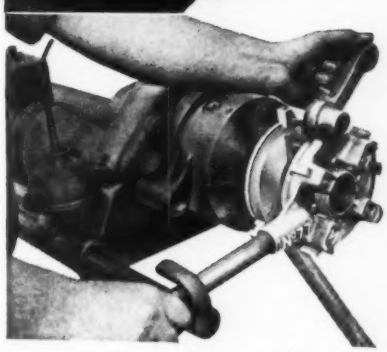
Equipment.—Three spreads are operated by the company. These all have new current-model equipment, and mobile units are used to communicate with field offices, and with each other by two-way radio.

C. T. TILLOTSON

F. M. JOHNSON

Personnel.—Albert C. Johnson is Trojan president; M. W. Crawford and Charles T. Tillotson are vice presidents, and Felix M. Johnson is secretary-treasurer. Each is a director and stockholder in the firm.

These two tools are designed especially for use with electric power drives!



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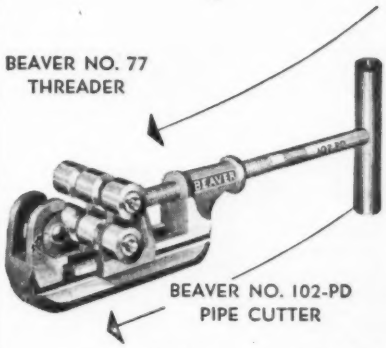

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XUM

NATURAL GAS

State Questions Merger

OKLAHOMA CITY.—Extent of the state's power to control the merger of public utilities will be tested in a suit of inquiry which Atty. Gen. Mac Q. Williamson has filed against Oklahoma Natural Gas Co. The issue involves Oklahoma's purchase of Guthrie Gas Utilities Co., Kingfisher Gas Co., General Fuel Co., and Oklahoma Central Gas Co.

The District Court will determine whether Oklahoma's absorption of the smaller companies is in violation of a constitutional prohibition against merger of companies having competing and parallel utility lines.

Oklahoma Natural has engaged in an expansion program which added 20,000 new natural-gas customers last year, bringing its total to 263,000 customers. The company distributes only natural gas, and its residential rates are said to be the lowest in the nation.

In the current fiscal year, Oklahoma Natural plans to spend $13,000,000 for new construction, which would represent the biggest single-year expansion in its history. To integrate its markets and effect economies in service, the company has been taking over small independent distributing units.

Panhandle to Appeal

NEW YORK.—Direct appeal to the U. S. Supreme Court will be taken by Panhandle Eastern Pipe Line Co. to settle its controversy with Michigan authority over the company's plan to sell dump gas directly to Ford Motor Co. in Dearborn.

Direct sale to Ford was blocked by the Michigan Public Service Commission which maintained that it could regulate the sales of an interstate pipe line to industrial customers. In a recent ruling, the Michigan Supreme Court upheld this decision. Previously an Ingham County court had issued a restraining order against the commission, holding it had no right to interfere with the direct sale of natural gas by Panhandle.

The issue between the transmission line and the commission falls in a category that permits direct appeal to the U. S. Supreme Court. Even if the highest court should uphold the Michigan decision, Panhandle would still be in position to ask the Michigan commission for a certificate to make direct sale to Ford and other large industrial users. Distributing companies that obtain their supply of natural gas from Panhandle have been fighting the direct sales.

Panhandle has a petition before the Federal Power Commission asking authority to sell Ford 55 million cubic feet of natural gas daily. Hearings are set for this month.

Sidney, Neb., to Take Gas

CASPER, Wyo.—Natural gas from the nearby Sunol field in Cheyenne County, Wyoming, will have its first commercial distribution in Sidney, Neb., scheduled to begin within a month. Source of immediate supply is the new well developed by Ohio Oil Co. which flowed 4,700,000 cu. ft. of natural gas daily from the "D" sand.

Ohio has contracted with Northern Utilities Co. here to distribute the output of the new field, lying about 30 miles west of Sidney. Gathering lines will be installed immediately to collect natural gas for the main line into Sidney.

The new well centers a block of some 700,000 acres leased by Ohio. Exploration has developed two fields of natural gas and three oil fields in the large tract now producing about 2,800 bbl. of crude oil daily. The tract is located within a 20-mile radius of an independently drilled natural-gas well, the 1 Anderson. First discovery in the field was made in May 1949.

Natural Gas for Refinery

PHILADELPHIA.—Natural gas will supplant oil as the fuel for Sun Oil Co.'s Marcus Hook refinery. The company's plan to expand its utilization of natural gas involves construction of a pipe line connecting the refinery with the transmission line of Transcontinental Gas Pipe Line Corp. Completion of the changeover is scheduled for early next year.

December Gas to Brooklyn

NEW YORK.—Arrival of natural gas in Brooklyn is now scheduled for early December in ample time to meet the heavier winter demand for home-heating. Brooklyn Union Gas Co. has reported the use of natural gas will save the company $3,000,000 annually.

Brooklyn Union has completed construction of 11 miles of pipe line connecting its distributing system with the main Texas-to-New York artery. Initial service will provide 70,000,000 cu. ft. of natural gas daily.

To take immediate advantage of this supply, Brooklyn Union will mix the natural gas with its own manufactured product with no increase in heating content. This mixture will be rated at 537 B.t.u., to be increased to 1,000 B.t.u. in approximately 2 years.

Third Expansion Step

WASHINGTON.—Additional capacity of 50 million cubic feet of natural gas daily is sought by Mississippi River Fuel Corp. in an application to the Federal Power Commission. Mississippi proposes to install compressor units totaling 27,500 hp.

Cost of the expansion program will be approximately $5,500,000, bringing the total system capacity to 435 million cubic feet daily. The project will be the third step in the development campaign which began in 1947, almost tripling the initial capacity of the system, and costing approximately $42,000,000.

Natural Gasoline

Light-Products Record

Production at natural-gasoline and cycling plants reached the all-time high of 498,000 bbl. daily in August, according to a report by the Bureau of Mines.

Natural-gasoline plant production averaged 372,000 bbl. daily while cycling plant production moved up to 126,000 bbl. daily.

Total output included 226,000 bbl. daily of natural gasoline, 188,000 bbl. daily of L.P.G., 49,000 bbl. daily of motor fuel and naphtha, and 25,000 bbl. daily of other products.

Since production of natural gas liquids is seasonal, the high level in August presages more new production highs during the winter months.

Plant to Be Expanded

McALLEN, Tex.—The McAllen cycling plant of the Taylor-Mayfair interests will be expanded, J. L. Sewell, vice president and chief engineer of the firm, announced last week. Additional absorbers, fractionating equipment, and power generators will increase throughput from 70,000,000 cu. ft. daily to nearly double that amount.

The original plant, constructed this year at a cost of more than $3,500,000, processes gas from 11 wells completed in the Harding sand at 7,390 ft. and from the Card sand at 7,900 ft.

Mayfair Minerals Corp. was formed during 1943 to develop the field, and Mayfair and Coastal Refineries, Inc., constructed the cycling plant this year. There followed a reorganization under the firm name of Taylor-Mayfair to take over operation of the plant.

Taylor-Mayfair is running two rigs in the McAllen field in an effort to increase the supply of gas for the plant.

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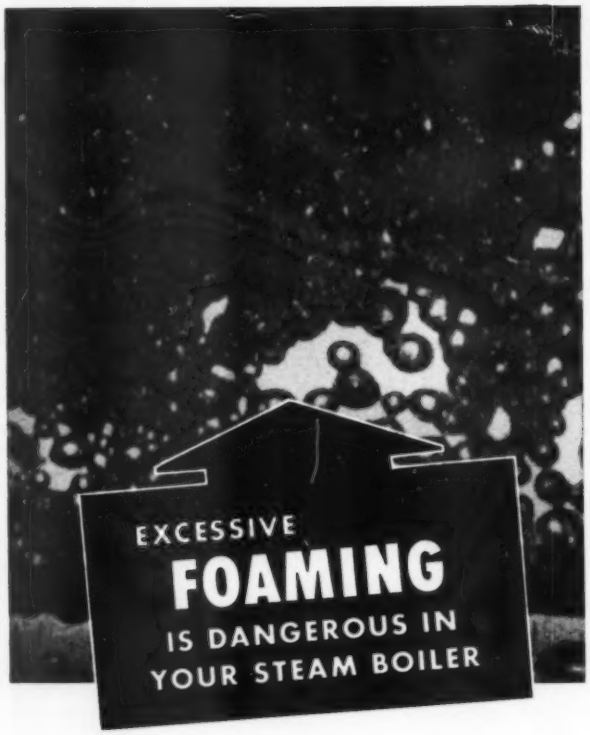

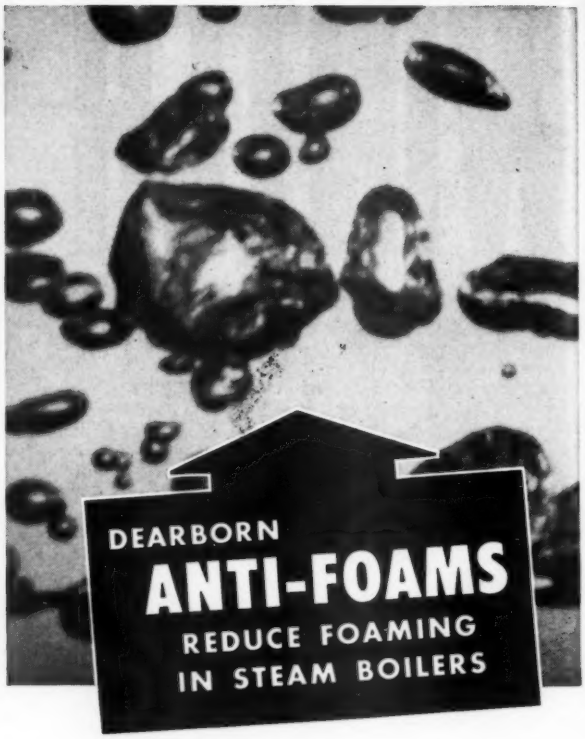

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Exploration and Drilling

Sand Bar Located by Seismograph

THE initial use of a new interpretation of standard reflection seismograph records designed for delineating sand-lens-type oil fields has had such successful results that the method appears destined for an important role in the science of oil exploration. The idea behind this interpretation opens a new approach to the location of stratigraphic traps and may ultimately result in a reliable method for pin pointing nonstructure-type oil pools without the expense of extensive drilling.

In the extension area of a narrow, winding, "shoe string" sand pool, Seismograph Service Corp., after experimenting in the developed portion of the pool, recommended 20 new locations on the basis of reflection-seismograph-record interpretations and saw 95 per cent of them yield producing oil wells.

Until now reflection seismograph as adapted to exploration for oil has been used primarily to locate masked structures likely to be oil bearing. During the past 15 years seismologists have become so expert at their work and so much work has been done that all subsurface structures with significant relief in the older oil-producing areas are believed to have been found. Research seismologists have been faced with the problems of developing techniques for picking up smaller and smaller structures and a reliable method for locating stratigraphic traps.

The problem of locating slight differences in subsurface relief results from the fact that great thicknesses of formations are not lithologically uniform over very large areas and, consequently, a calculated velocity of seismic waves between known points is seldom exactly applicable to a given spot between these points. Since the seismologist translates time to feet, depths will be off if his velocity calculations are off. These discrepancies in velocity, however, are not critical until extremely small differences in depths of a deep horizon are wanted.

It has long been known that seismic waves travel slower in fluid-saturated sandstone than in unsaturated rocks. This means that in shooting across a large oil-bearing sand lens in a local monocline the records will indicate exaggerated depths for that portion of the reflecting horizon beneath the lens. However, unless the lens is extremely thick, this difference will be very slight. It has also been found that most sand lenses are associated with differential compaction of the surrounding shale so that a slight high is reflected in beds above the lens for a considerable distance up that section.

With these two ideas in mind it becomes obvious (now that the idea has been made known) that fluid-saturated sand lenses can be located by measuring time differences between two essentially parallel reflecting horizons. "Time thicknesses" caused by the high above and the false low below a sand body will indicate the presence of a comparatively slow-velocity rock mass that may well be an oil-bearing sand lens. This time measuring is done trace by trace because sand lenses are frequently too small in areal extent to locate by using the record average.

The initial experiments to test this new interpretation theory were made at South Ceres pool, Noble County, Oklahoma. This pool produces from the 0 to 60-ft.-thick Burbank sand which is found at a depth of about 4,500 ft. The sand body has a maximum width of about 1,000 ft. and extends without a break for over 7 miles. The field is developed only one location wide at most places and in no case is it developed over two 20-acre locations wide. There is a sharp line of demarcation between producers and dry holes.

The results of Seismograph Service Corp.'s experimental work, and initial and subsequent successes in the unknown extension area to the north were sufficiently convincing that companies with acreage along the general trend of this snake-like pool used seismograph work in the location of their wells.

H. M. Thralls, of Seismograph Service Corp., Tulsa, is going to present his paper on this method of interpretation at one of this winter's meetings of the Geophysical Society of Tulsa. *Philip C. Ingalls.*

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

WEST TEXAS.—Ralph Lowe 1 Hill, Midland County wildcat which unloaded oil on a drill-stem test in Dean sand from 9,100-78 ft., was to continue drilling ahead on its Ellenburger contract. The well is said to have made the first show for commercial production from that zone, in the Permian Basin. Completion potential on Kent County's Ellenburger discovery was 1,440 bbl. of oil a day. The pool opener is Star Oil Co. 1 Blanche Young in 54-5-H&GN, near the Garza County line.

ROCKY MOUNTAIN AREA.—American Liberty Oil Co.'s new discovery at East Meadow Creek, Wyoming, is expected to lead to new development in the fifth pool of this area. British-American Oil Producing Co. completed as a gas discovery its Longs Creek, Wyoming, wildcat, and found oil saturation in Phosphoria at its Big Horn-Lucerne test in the Big Horn Basin. A gage of more than 12,000,000 cu. ft. of gas daily was recorded at the J. M. Huber Corp. discovery in the Lee area, Colorado.

MID-CONTINENT.—In Coal County, Oklahoma, Ohio Oil Co. 1 Jones flowed 9,760,000 cu. ft. of gas from a deep bromide sand. The apparent discovery is 1½ miles southwest of shallow Ashland gas field. Two new pools in Kansas received prospective confirmation this week: in Wabaunsee County, Skelly Oil Co. 1 Powell may prove production at Mill Creek, and in Sumner County, Texas Co. 2 Hoffsiefken will apparently confirm Fall Creek field. Just across the state line, in Platte County, Missouri, a rank wildcat, Callison-McHenry 1 Kirk, failed to find either oil or gas.

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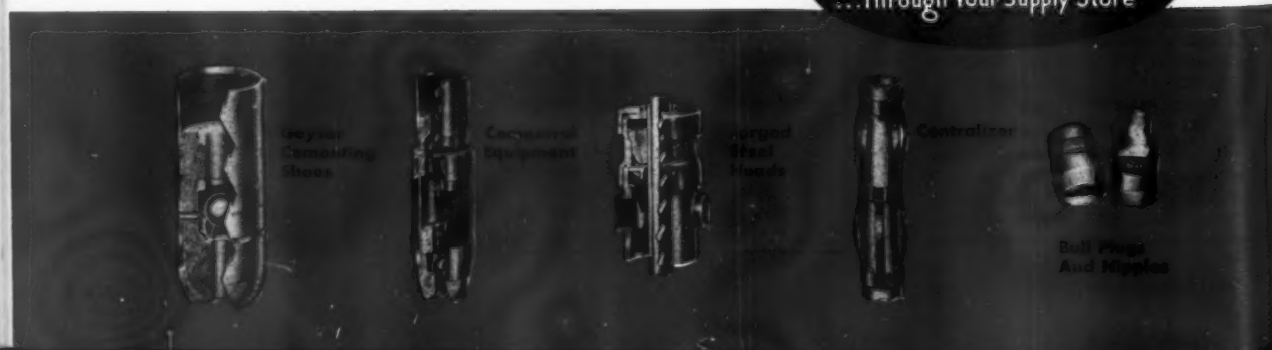

Texas Gulf Coast

Potential Tests Run on DeWitt County Discovery

HOUSTON.—Shell Oil Co. has run potential test on its 1 Gohlke Heirs, new oil pool discovery in the T. J. Thigpen Survey, Abstract 614, DeWitt County. Through a 16/64-in. choke, the well was gaged for 320 bbl. of 32°-gravity oil daily, producing through perforations at 8,142-47 ft. Tubing pressure during the test was 675 psi. and casing pressure was 1,425 psi.

Meanwhile, 1,800 ft. to the northeast, Shell is drilling below 4,300 ft. in its confirmation test to the new discovery. The new well is B-1 F. W. Gohlke Heirs, also in T. J. Thigpen Survey.

On the west flank of Hull field, John W. Mecom has squeezed perforations at 8,124-68 ft. in his 1 E. F. Failor, and will test sand at 7,800-900 ft. On a previous test through perforations at 8,124-68 ft., the well flowed at the rate of 46½ bbl. of oil per day through a 14/64-in. choke. The wildcat is located in the W. S. Swilley Survey, Section 188, A-717, Liberty County.

Skelly Oil Co. has run potential test on 1 E. O. Koutnik, wildcat test 1½ miles northeast of Bonney, Brazoria County. The well was drilled to a depth of 9,340 ft., and 5½-in. casing set at 7,793 ft. Through a 7/32-in. adjustable choke, the well flowed 46 bbl. of 54°-gravity condensate, with tubing pressure of 2,250 psi. and casing pressure of 2,700 psi. Location is in the W. D. C. Hall Survey, A-69.

Also in Newton County, Standard Oil Co. of Texas has completed 1 Mrs. Jennie Watson as a new east extension to Gist field. On potential test, the well flowed 155 bbl. of 40°-gravity oil per day through ⅛-in. choke. Tubing pressure was 1,100 psi. Production is through perforations at 7,193-94 ft. Well is located in the M. A. Watson Survey, A-1,268.

TEXAS GULF COAST (DISTRICTS 2 AND 3) SUCCESSFUL WILDCATS

Bee County: Gas discovery "Papalote"—W. R. Quin & T. F. Murchison-Massingill Operator's Account 1 J. A. Tynes, T. H. Hart Sur. A-28, 4 mi. NE of Papalote, TD 5,596 ft., perf. 5,530-31 ft., IP: 2,609,000 cu. ft. of gas, TP 1,108 psi., SITP 2,071 psi.

DeWitt County: Gas-condensate discovery—United Producing Co., Inc., 1 A. J. House, Thos. Barry Sur., A182, 18 mi. SE of Yoakum, TD 7,806 ft., perf. 5,336-46 ft., IP: 175 bbl. condensate plus 31,000,000 cu. ft. of gas on open flow gage, SIP 2,375 psi.

Fayette County: Oil discovery—Armstrong & Sutton Drilling Co. 1 F. A. Kremel, Samuel Millet League, A-70, north of Cistern, TD 1,159 ft., top pay 1,128 ft., open hole 1,129-59 ft., IP: 20 bbl. oil on pump, 24.6° gravity.

TEXAS GULF COAST (DISTRICTS 2 AND 3) WILDCAT FAILURES

Bee County: Geo. W. Graham & Emory M. Spencer 1 Tom J. Syma, Felix Hart Sur., A-26, SW of Papalote, dry, TD 6,002 ft.

Brazoria County: Holmes Drilling Co. & C. W. Vick 1 Ethel R. Coop Estate, Warren D. C. Hall Sur., A-69, dry, TD 7,762 ft.

Calhoun County: The Chicago Corp. A-1 J. J. Welder, Section 6, Block E., E. Hidalgo Grant, 5 mi. SE of Seadrift, dry, TD 6,020 ft.

Fayette County: W. B. Rietz 1 F. A. Kremel, Samuel Millet League, 3 mi. N of Cistern, dry, TD 1,185 ft.

George D. Stevens 1 Anton Psencik, J. T. Whitesides League, 2 mi. N of Cistern, dry, TD 1,765 ft.

Fort Bend County: Brazos Oil & Gas Co. 1 Lockwood-Sharp, William McMahon Survey, A-285, 5¾ mi. SW of Thompson, dry, TD 8,297 ft.

Jackson County: Sohio Petroleum Co. 2

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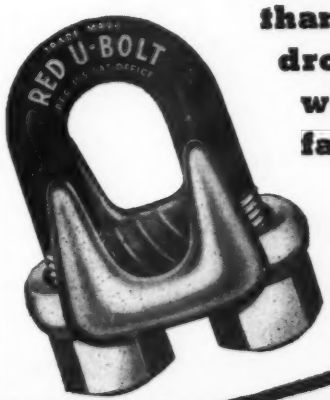

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L. M. Nyegaard, W. D. Sutherland Sur., A-76, dry, TD 6,750 ft.

Live Oak County: Humphries & Hotchkin 1 G. Havelka. Juan McGloin Sur., A-27, 7 mi. N of Three Rivers, dry, TD 1,685 ft.

Montgomery County: The Moran Corp. B-1 Hutchings-Sealy National Bank, Jonathan C. Pitts Sur., 6 mi. NE of Conroe, dry, TD 6,060 ft.

Victoria County: Houston Oil Co. of Texas 1 Gottlieb Gutman, J. M. Cobarrubas Sur., A-9, 1¼ mi. SW of Cologne field, dry, TD 5,265 ft.

Wharton County: Salt Dome Production Co. et al 1 G. R. Hawes, Gustavus E. Edwards Sur., 1 mi. NE of Magnet, dry, TD 6,510 ft.

California

Discovery Seems Assured In San Fernando Valley

LOS ANGELES.—An oil discovery seems assured at Los Nietos Co. 1 Edwards in the San Fernando Valley of northern Los Angeles County. Prospects for its successful completion were greatly improved last week when it was found that the well had sanded up and that the pump was not working properly. With these conditions remedied the wildcat has been pumping from about 10 to 20 bbl. of 24°-gravity crude daily.

Located in 1-2n-16w, the test was drilled to 5,722 ft. before being plugged back, whipstocked, and redrilled to 4,036 ft. Because of water difficulties hole then was plugged back to 3,980 ft. It is expected that an offset, which will seek a thicker pay section down structure, will be started as soon as the pool opener is completed.

In eastern Cuyama Valley, Santa Barbara County, Honolulu Oil Co. suspended drilling at 7,509 ft. at its 1 Honolulu-Oceanic in 19-9n-25w. Oceanic Oil Co. and Shell Oil Co., however, have taken over the wildcat and will carry it some 500 or 1,000 ft. deeper. The test topped the Monterey at 1,205 ft. and the Painted Rock at about 1,800 ft.

The region's newest discovery, the Hancock area in the rugged hills north of western Cuyama Valley, received two setbacks last week. A ⅝-mile northwest stepout to the discovery, which was Hancock Oil Co. 4 Bishop, 31-32s-20e, was abandoned at 5,691 ft. A southeast offset, a Universal Consolidated Oil Co. test, failed to find the pay and was plugged back preparatory to directional drilling to the northeast. Hole had been carried to 5,444 ft.

CALIFORNIA WILDCAT FAILURES

Fresno County, Coalinga area: Oceanic Oil Co. 65-17 Oceanic-Whittaker, 17-19s-15e, dry, TD 2,500 ft.

Kern County, Devils Den area: G. Graham 2 Core Hole, 23-25s-18w, dry, TD 657 ft.

Poso Creek area: Oceanic Oil Co. 2 Wickham, 34-27s-28e, dry, TD 1,834 ft.

Tejon Hills area: O. M. Slossom 10 Slossom, 16-11n-18w, dry, TD 2,005 ft.

San Luis Obispo County, Russell Ranch area: F. C. Griggs & Assoc. 1 Griggs-Russell, 25A-11n-28w, dry, TD 4,243 ft.

Northwest Cuyama: Universal Consolidated Oil Co. 81-36 Humble, dry, TD 5,286 ft.

Los Angeles County, east Palmdale area: J. B. Halbert 1 Houston, 15-5n-8w, dry, TD 600 ft.

West Antelope Valley: California Metal Products Co. 10-1 Scott, 10-8n-15w, dry, TD 3,015 ft.

Monterey County, east San Ardo area: Standard Oil Co. of California 57-8 Alexander, dry, TD 2,902 ft.

Santa Cruz County, north Santa Cruz area: British-American Oil Prod. Co. 1 Gairaud, 18-9s-2w, dry, TD 1,113 ft.

West Moody Gulch area: M. W. Wheeler 1 Wheeler, 6-9s-2w, dry, TD 350 ft.

Ventura County, Sespe area: Coast Supply

Co., Ltd. 1 Mitchell, 29-5n-19w, dry, TD 1,605 ft.

Ozena area: Superior Oil Co. 65-20 Smith, 20-76-23w, dry, TD 5,286 ft.

Southwest Texas

Webb County Discovery Flows Gas-Condensate

CORPUS CHRISTI.—Seaboard Oil Co. has run a gage on its new Webb County Wilcox discovery, 1 Mary K. Withers. Through perforations at 6,500-10 ft., the well flowed at the rate of 20,000,000 cu. ft. of gas per day with a considerable amount of condensate. This new discovery is located 25 miles east of Encinal, in the BS&F Survey 40, Certificate 1,598, and is approximately 20 miles south of the nearest Wilcox production. Hole is bottomed at 6,725 ft. and operators cemented 5½-in. pipe at 6,538 ft. for completion attempt.

New pay is being opened in North Rowden field, Duval County, at Dale H. Rowden and C. W. Moulder 1 Weil-Colvin, BS&F Survey 567. Hole was drilled to a depth of 2,715 ft. and pipe was set at 1,765 ft. Operators plugged back to 1,758 ft. and perforated from 1,730-41 ft. The well swabbed in making pipe line oil and tanks are now being built. Operators will put the well on pump for completion.

H. R. Smith and American Republics Corp. have backed up the hole and completed their 1 J. C. Dilworth, Jr., as an oil discovery in McMullen County. After drilling to total depth of 8,074 ft. into salt, operators plugged back and perforated at 4,929-34 ft. for completion. The well flowed 130 bbl. of 36°-gravity oil daily through 10/64-in. choke. Tubing pressure was 300 psi.

The Union Oil Co. of California tested oil at the rate of 100 bbl. per day in the 2 R. H. Welder, wildcat, 1½ miles west-northwest of Taft field, San Patricio County. Gravity of the oil was 22° and tubing pressure was 425 psi. Production was through perforations at 4,124-26½ ft. The well sanded up, and operators squeezed these perforations and will reperforate for another test.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) SUCCESSFUL WILDCATS

Hidalgo County: New pay at LaReforma—The Chicago Corp. 2 Theresa Barrera, Share 7, San Jose Grant, top pay 6,231 ft. (Reservoir F), perf. 6,321-39 ft., IP: 2,450,000 cu. ft. of gas, open flow, SIP 2,276 psi.

McMullen County: New oil discovery—H. R. Smith and American Republics Corp. 1 J. C. Dilworth, Jr., Rafael Vasquez Sur., 42, Abstract 486, 6½ mi. W of Tilden, TD 8,074 ft., perf. 4,929-34 ft., IP: 130 bbl. oil, 10/64-in. choke, TP 300 psi., 36° gravity. (This is also a salt dome discovery).

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) WILDCAT FAILURES

Bexar County: Rollin V. Hill 2 Calvin B. Hawkins, Miguel Gortaris Sur. 5, dry, TD 1,869 ft.

Cameron County: The Texas Co. A-1 Mrs. Isabel Y. Garcia, "Potrero de Santa Isabel" Rafael Grant, A-1, 10 mi. W of Port Isabel, dry, TD 9,828 ft.

Duval County: W. D. Kennard, Ralph and Dale Rowden 1 D.C.R.C., GB&CNG RR Sur., 55, A-719, 1 mi. W of Cedro Hill field, dry, TD 2,449 ft.

Jim Wells County: Arkansas Fuel Oil Co. 1 B. R. Goldapp, Geo. Rounds Sur., A-407, 2½ mi. N of Alfred, dry, TD 5,460 ft.

Kendall County: Kendalia Co., Inc., 1 C. & H. Seidensticker, Antonio Rodriguez Chacon Sur. 257, 17 mi. NE of Boerne, dry, TD 1,290 ft.

Kenedy County: Atlantic Refining Co. 4 H. F. McGill, Santa Rosa de Arriba Sur., A-35, dry, TD 8,499 ft.

McMullen County: Henderson Coquat 1 J. H. Dickinson, Block 66, McMullen townsite, D. M. Stapp Sur., A-424, dry, TD 6,812 ft.

Daubert & Achning 1 Huff Bros., Sec. 38 of C. C. Shumway Subdn. of Shiner Ranch, 5 mi. SW of Ezzell field, dry, TD 1,809 ft.

Daubert & Achning 1 T. Clifton Wheeler, Sec. 22, C. C. Shumway Subdn. of Shiner Ranch, mi. SW of Ezzell field, dry, TD 1,665 ft.

Starr County: Hawn Bros. 2 San Antonio Loan & Trust Co. and H. P. Guerra, El Javali Grant, A-77, dry, TD 1,935 ft.

Webb County: The Texas Co. 1 Frost National Bank, Tiburcio Guerra Sur., A-2,104, 2½ mi. SW of Mirando City, dry, TD 2,908 ft.

Williamson County: Kenneth Lee et al 1 M. H. Stewart, Miguel Davilla Sur., 10 mi. E of Ranger, dry, TD 800 ft.

Wilson County: Stanolind Oil & Gas Co. 1 Joe Laskowski, A. Drane Sur., A-324, 2 mi. SW of Denhawkin, dry, TD 7,036 ft.

South Louisiana

Gas-Distillate Discovery For Terrebonne Parish

NEW ORLEANS.—Four miles due east of Shell Oil Co.'s new discovery in Turtle Bayou field, Terrebonne Parish, Union Producing Co. has completed its 1 Continental Land & Fur Co., 35-17s-13e, for a new gas-distillate discovery. Through a 3/8-in. positive choke, the well flowed 12,161,000 cu. ft. of gas per day, plus some 53.2°-gravity distillate. Hole is bottomed at 11,957 ft. and production is through perforations at 11,085-104 ft. Tubing pressure was 3,926 psi. This new discovery is located in the Kent Bayou area of Terrebonne Parish, approximately 12 miles southeast of Morgan City and 10 miles southwest of Gibson field.

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New deep pay has been opened in Delta Duck Club field, Plaquemines Parish, at The Texas Co. 3 State Lease 335-Delta Duck Unit 2, 36-20s-19e. On initial test, the well flowed 43 bbl. of 57°-gravity condensate plus 449,000 cu. ft. of gas per day through ⅛-in. choke, with flowing pressure on the tubing of 2,500 psi. The well is producing through perforations at 11,766-84 ft. Hole is bottomed at 11,900 ft. and operators set 5-in. liner on bottom.

Gulf Refining Co. tested salt water on initial test in its 1 Ben J. Altheimer Estate, et al, 13-4n-4e, Avoyelles Parish wildcat and prospective Wilcox discovery. Operators perforated 5,932-38 ft. with recovery being salt water. Further testing is due as soon as squeeze job is effected. On electrical survey, Wilcox was topped at 4,208 ft. and oil sand logged at 5,932-38 ft.

Magnolia Petroleum Co. has successfully overcome loss of circulation difficulties in its N-1 Doornbos-McPherson, deep test in Hurricane Creek field, Beauregard Parish. Well at a total depth of 13,603 ft. and operators set 7-in. casing to 13,588 ft. Due to high pressures exerted by the well, there was some indication that a deeper pay is probably in store for the field.

SOUTH LOUISIANA SUCCESSFUL WILDCAT

Terrebonne Parish: Gas-condensate discovery "Kent Bayou field"—Union Production Co. 1 Continental Land & Fur Co., 35-17s-13e, TD 11,957 ft., perf. 11,085-104 ft., IP: 56,000,000 cu. ft. of gas per day, open flow, no gage on condensate, 53.2° gravity, 12,461,000 cu. ft. of gas, ⅜-in. choke, TP 3,926 psi.

SOUTH LOUISIANA WILDCAT FAILURES

East Baton Rouge Parish: W. A. Romans et al 1 J. A. Smith et al, Unit 1, 50-5s-2e, dry, TD 8,230 ft.

Vermilion Parish: Sohio Petroleum Co. 1 Mrs. F. Neelis, 14-11s-2w, dry, TD 10,751 ft.

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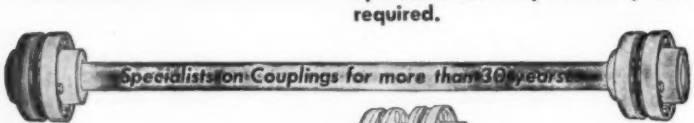

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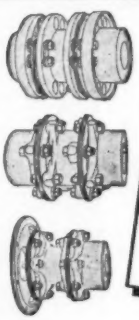

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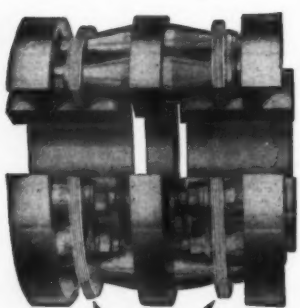

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Kansas

Second Well Confirms Mill Creek Discovery

CONFIRMATION of the recent oil discovery at Mill Creek, Wabaunsee County, in the Forest City Basin, is in prospect. Skelly Oil Co. 1 Powell, NW SE NE 2-13-10e, north offset to the discovery well, 2 Thoewe, has reached the new pool's pay zone, Viola lime, where it found good saturation and now has casing run for completion.

Viola lime, topped at 2,936 ft. (—1,834 ft.), was drilled to 2,941 ft., where a drill-stem test, lasting 2 hours, got 350 ft. of clean oil. Top of pay is about 18 ft. lower than in the discovery well.

The Texas Co. 2 Hoffisiefken, NE SW SW 3-35s-3w, first confirmation test for the recently opened Fall Creek pool, just west of Caldwell, Sumner County, in the extreme southern part of the state, flowed at the rate of 60 bbl. of clean oil per hour through ½-in. choke at completion. Placed on ⅜-in. choke, its flow was at the rate of 38 bbl. per hour. Production is from the Simpson zone, topped at 4,700 ft. (—3,575 ft.), and drilled to a total depth of 4,760 ft. Hole is open below 4,717 ft. in Simpson dolomite, topped at 4,711 ft. Casing is perforated at 4,700-10 ft., opposite the Simpson sand.

W. E. Studnicka and associates have run casing to test promising oil showings encountered in Viola lime at their 1 Richter, SE SE SW 19-15-3, a rank wildcat located about 8 miles southwest of Salina in southern Saline County. The pay was logged at 3,385-91 ft. (—2,095-2,101 ft.). A 45-minute drill-stem test of the zone yielded 120 ft. of clean oil and 90 ft. of oil-cut mud in the pipe break-down. Nearest production is in the small Olsson and Menton pools, the former about 5 miles to the southeast and the other about the same distance northeast.

KANSAS SUCCESSFUL WILDCATS

Barton County: Holl 1 Kasselman, SE SE SW 22-20s-11w, elev. 1,763 ft., 838 bbl. oil per day from Lansing at 3,155-58 ft., TD; Heebner 2,927 ft., lime 3,049 ft., Lansing-Kansas City 3,608 ft.

Phillips County: Honaker 1 Brockett, SW SW SW 30-1s-18w, elev. 2,245 ft. DF, flowed 317 bbl. oil per day from Lansing at 3,518-22 ft. and 3,530-37 ft., TD 3,540 ft., anhydrite 1,824 ft., Heebner 3,394 ft., Kansas City 3,421 ft.

Stafford County: Petroleum, Inc. 1 Hall, SE SE SW 7-21s-13w, elev. 1,912 ft., pumped 29 bbl. oil per day from Arbuckle at 3,636-40 ft., TD; anhydrite 807 ft., Heebner 3,204 ft., lime 3,323 ft., Lansing-Kansas City 3,325 ft., Viola 3,562 ft., Simpson 3,580 ft.

Sumner County: Herndon Drilling 2 Hunt, SW SE NW 16-34s-1e, elev. 1,189 ft., pumped 160 bbl. 45°-gravity oil per day from Simpson sand at 4,000-04 ft., TD; Mississippi chat 3,653 ft., Kinderhook 3,964 ft., Simpson 3,972 ft.

Woodson County: Rogers-Evans 1 Steele, NW NW NE 28-23s-15e, 12 bbl. oil per day from lime at 1,510-35 ft., TD; chat 1,500 ft.

KANSAS WILDCAT FAILURES

Barton County: GMR 1 Huslig, SW SW NE 25-17s-12w, elev. 1,819 ft., dry, TD 3,392 ft., Lansing-Kansas City 3,046 ft., Arbuckle 3,352 ft.

Darby & Bothwell 1 Laudick "A," NE NE SW 23-18s-14w, elev. 1,901 ft., dry, TD 3,455 ft., Lansing-Kansas City 3,158 ft., Arbuckle 3,434 ft.

Lauck 1 Tichner, SE SW SW 11-16s-11w, dry, TD 3,340 ft.

Coppinger et al 1 Steckel "B," SW NW SW 11-20s-12w, dry, TD 3,408 ft.

Gulf 1 Bloomer, CNL SW NE 12-18s-11w, elev. 1,771 ft., dry, TD 3,800 ft., Lansing-Kansas City 3,000 ft., Arbuckle 3,276 ft.

Butler County: Meyers et al 1 Huntley, SW NE NE 31-26s-7e, dry, TD 2,765 ft.

Cowley County: Shawyer 1 Smith, NW NW

NW 36-31s-4e, elev. 1,161 ft., dry, TD 2,150 ft., Layton 2,229 ft., Mississippian 2,924 ft.

Edwards County: Sinclair 1 Burcher, SE SE NE 9-24s-19w, elev. 2,159 ft., dry, TD 5,002 ft., Lansing-Kansas City 3,965 ft., Mississippi lime 4,538 ft., Arbuckle 4,970 ft.

Graham County: Heathman 1 Loyd, SW SW SW 33-9s-22w, elev. 2,346 ft., dry, TD 4,077 ft., Lansing-Kansas City 3,615 ft.

Greenwood County: Scanlon-Dillard et al 1 Kimbell, NW NE NW 10-24s-13e, dry, TD 1,731 ft.

Kingman County: Wakefield-Ross 1 Bloinger, SE SE NE 28-28s-5w, elev. 1,384 ft., dry, TD 3,885 ft., Mississippi lime 3,83[illegible] ft.

C.S.O. 1 Simons, SW SW NW 1-28s-5w elev. 1,417 ft., dry, TD 3,832 ft., Lansing 2,894 ft.

Morris County: Atlas et al 1 Peterson, NW NW SW 34-16s-5e, elev. 1,461 ft., dry, TD 2,344 ft., Lansing-Kansas City 1,708 ft.

Phillips County: Barnett 1 Krafft, SW SW SE 33-2s-19w, elev. 2,080 ft., dry, TD 3,676 ft., Heebner 3,256 ft., Lansing-Kansas City 3,284 ft., Arbuckle 3,649 ft

Rooks County: Aladdin 1 Shaw, SE SE NW 10-10s-18w, elev. 2,170 ft., dry, TD 3,830 ft., anhydrite 1,555 ft., Lansing-Kansas City 3,417 ft.

Anschutz 1 Mongeau, SE SE SW 21-9s-19w, elev. 2,177 ft., dry, TD 3,693 ft., Lansing-Kansas City 3,374 ft., Arbuckle 3,639 ft.

Palmer Oil 1 Wilson, NW NW SW 11-9s-18w, elev. 2,053 ft., dry, TD 3,625 ft., Lansing-Kansas City 3,245 ft., Arbuckle 3,576 ft.

Russell County: B. H. & P. 1 Eulert, SW NW SE 26-11s-15w, elev. 1,881 ft., dry, TD 3,385 ft.

Sedgwick County: Markham-Allison 1 Gow, SE SE NW 15-27s-1w, elev. 1,314 ft., dry, TD 3,604 ft., Lansing-Kansas City 2,648 ft., Arbuckle 3,591 ft.

MISSOURI WILDCAT FAILURE

Platte County: Callison-McHenry 1 Kirk, SE SW SE 15-53n-36w, elev. 777 (?) ft., dry, TD 2,749 ft.

Michigan

Shallow Gas Zone Found In Rose Lake Oil Pool

MOUNT PLEASANT. — Showing 1,132,000 cu. ft. of gas a day from the Michigan Stray section, Brazos Oil & Gas Co. 1 Compton Community, C WL NW 31-19n-9w, was completed as a shallower zone gas discovery in the older Rose Lake oil pool. Top of Stray was logged at 1,337 ft. Drilling was halted at 1,375 ft., and hole was plugged back to 1,355 ft. to shut off bottom-hole water.

Robert Bond reported that a potential top Traverse oil pay was logged at his 2 Krivetsky, SE SE NW 12-20n-1w, Butman Township, Gladwin County. The Bond test is the direct north 10-acre offset to the Squaw Bay Traverse discovery for Butman field, drilled by H. E. Bell. The 2 Krivetsky logged top of Traverse at 2,784 ft. and hole carried 350 ft. of free oil natural at 2,791 ft., present depth. This show will be acidized.

A well spacing order has established a diagonal northeast-southwest 20-acre drilling pattern for all future Traverse wells in the Butman field.

MICHIGAN SUCCESSFUL WILDCATS

Gladwin County, Butman Township: H. E. Bell 1 Serlin & Kamisky, NE NE SW 12-20n-1w, Traverse 2,870 ft., 72 bbl., TD 2,791 ft. (Shallow zone discovery in Butman Dundee-Richfield oil pool).

Osceola County, Rose Lake Township: Brazos Oil & Gas Co. 1 Compton Community, C WL SW 31-19n-9w, Stray 1,337 ft., 1,132,000 cu. ft. gas, TD 1,375 ft., PB to 1,355 ft. (Shallow Stray gas

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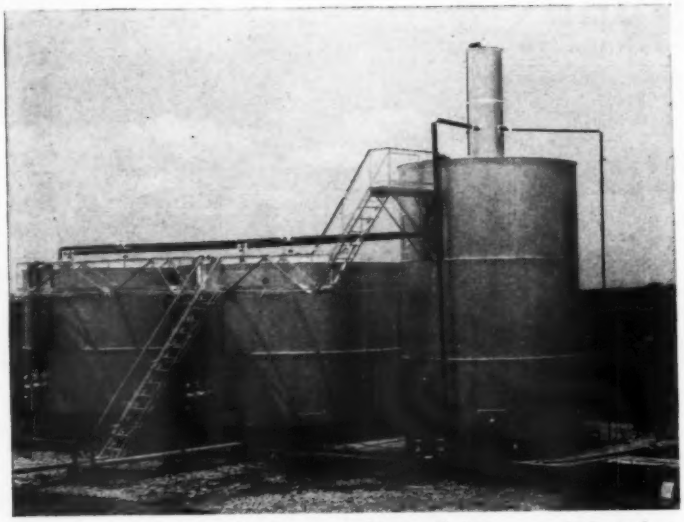

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discovery in Rose Lake Traverse oil pool).

MICHIGAN WILDCAT FAILURES

Isabella County, Deerfield Township: Central Michigan Oil Co. 1 Ward et al, NW SW SW 5-14n-5w, dry, TD 3,784 ft.

Mecosta County, Mecosta Township: Louis Rose 1 Biehler, SW NE SE 23-14n-10w, dry, TD 1,142 ft.

Ogemaw County, Edwards Township: Basin Oil Co. 1 Illig, SE SE SE 16-21n-1e, Dundee 3,303 ft., dry, TD 3,430 ft.

Osceola County, Orient Township: D. C. Slusser 1 Wood, SE SE SE 22-17n-7w, dry, TD 3,890 ft.

Ottawa County, Crockery Township: Fisher-McCall Oil & Gas, Inc. 1 Way, NE NW SE 35-8n-15w, dry, TD 1,757 ft.

North Central Texas

Good Oil Flow Tested At Caddo Discovery

WICHITA FALLS.—Southeastern Throckmorton County has been assured a good flowing Caddo discovery at Warren Oil Corp. 1 Graham unit, northeast of Woodson. Operators drilled plug from casing set at 3,908 ft. and after acid treatment the well kicked off at an estimated rate of 15 bbl. of oil an hour. Production was from 11 ft. of pay topped at 3,908 ft. Second test of the wildcat gaged 322.6 bbl. of oil in 24 hours, flowing through 16/64-in. choke.

Northeast of Woodson, Bridwell Oil Co. 1 M. A. Tuttle had only slight oil shows in swabbing on perforations in the Caddo from 3,876-86 ft. and was to back up for further testing of the Strawn from 3,196-3,205 ft. That section had shown for discovery production while drilling.

Cities Service Oil Co. and Sinclair Oil & Gas Co. 1-170 SMS Ranch, northwestern Throckmorton County wildcat, was waiting on orders at 5,245 ft., after penetrating some 89 ft. of Mississippian limestone which yielded some gas on drill-stem tests. The well had been contracted to the Ellenburger, but had shown for production in the Caddo section, and drilling was being held up pending a decision to continue or plug back.

Northeastern Nolan County was in line for a deep discovery as pipe was being run for completion attempt at Texas Pacific Coal & Oil Co. 1-A May Sears, 7 miles east of Sweetwater. Top of the Ellenburger was logged at 5,950 ft. and after drilling to 5,973 ft. a drill-stem test recovered oil-cut mud. It was deepened to 6,014 ft. and with packer at 5,973 ft. had gas at the surface in 3 minutes, and recovered 660 ft. of oil plus 210 ft. of heavily oil-cut mud. Flowing pressure was 205 psi. Testing tool was open 2 hours and 10 minutes.

In southern Wise County the Cottondale gas-distillate field has been extended south almost to the Cottondale townsite at Signal Oil & Gas Co. 1 J. I. Gentry. The well had originally completed as a small Strawn limestone producer, then drilled ahead to find gas in the conglomerate section. A drill-stem test from 5,392-5,408 ft. had a flow of gas gaged at 1,250,000 cu. ft. daily.

Stonewall County's second Bend conglomerate area had a 1½-mile east extension in prospect this week at R. J. Carraway 1 John Behringer. A 2-hour drill-stem test from 5,868-81 ft., total depth, had gas in 10 minutes and recovered 4,000 ft. of clean oil, plus 90 ft. of oil-cut mud. Flowing pressure was 400 psi.

NORTH TEXAS (DISTRICTS 9 AND 7-B) SUCCESSFUL WILDCATS

Brown County: Hickok & Reynolds 1 W. R. Chambers, J. L. Williams Sur. 146, 3 mi. SW Cross Cut, TD 1,350 ft., Cross Cut sand 1,338 ft., pumped 25 bbl. of 41°-gravity oil a day.

Jones County: West Central Drilling Co. 1 A. Collins, 7-16-T&P, 2 mi. SE Hodges, TD 2,565 ft., PB 2,105 ft., lime pay 1,962-

ft., pumped 90 bbl. 30°-gravity oil a day.

Nolan County: Sun Oil Co. 1 J. P. Maddox, 43-1A-H&TC, 8 mi. SW Maryneal, TD 7,132 ft., elev. 2,513 ft., Ellenburger 7,114 ft., perf. 7,016-32 ft., pumped 16 bbl. 47°-gravity oil a day.

Throckmorton County: Pan American Production Co. et al 1 W. R. Matthews, T. Mounts Sur., A-229, 16 mi. SW Throckmorton, TD 5,025 ft., Mississippi pay 4,570-90 ft., 6,500,000 cu. ft. of gas daily, open 2-in. tubing.

Wilbarger County: Frank Wood 1 W. T. Waggoner est. "T," 51-14-H&TC, 8 mi. SE Vernon, TD 2,995 ft., pumped 10.5 bbl. 39°-gravity oil a day, perf. 1,922-25 ft.

NORTH TEXAS (DISTRICTS 9 AND 7-B) WILDCAT FAILURES

Archer County: Frank Wood 1 Joe Schroeder, Lot 15, Blk. 4, Clark & Plumb, ¾ mi. NW Windthorst, dry, TD 2,000 ft.

Baylor County: Tres Oil Co. 1 E. W. Hunt, Blk. 23, J. Garner Sur., 4-150, 4 mi. E Goree, dry, TD 1,899 ft.

Callahan County: McElroy Ranch Co. 2 J. H. McKinney, Sec. 3154, TE&L Sur., 4 mi. NE Putnam, dry, TD 468 ft.

Fisher County: A. A. Cameron & Randolph Scott 1 Rex Gladson, 115-2-H&TC, 4 mi. SE Rotan, dry, TD 5,686 ft., elev. 2,004 ft.

Empire Drilling Co. 1 Maggie Bacot, 190-2-H&TC, 3 mi. N Rotan, dry, TD 6,654 ft., elev. 1,886 ft., Mississippian 6,436 ft., Ellenburger 6,577 ft.

Skelly Oil Co. 1 T. G. Stevenson, Sec. 5½, John Rodman Sur., 1 mi. E Longworth, dry, TD 4,003 ft., elev. 2,003 ft.

Stanolind Oil & Gas Co. 1 W. L. Barbee, George Creath Sur. 221, SE corner of county, dry, TD 5,105 ft., elev. 1,849 ft.

Taylor County: William Perlman 1 J. G. Pope, 12-16-T&P, 3½ mi. NE Tye, dry, TD 2,745 ft.

Wichita County: Palmer Drilling Co. 1 Waggoner, Sec. 1, GC&SF Sur., A-528, 6 mi. N Kamay, dry, TD 1,983 ft. in shale.

Louisiana-Arkansas

Claiborne Parish Wildcat Testing Back Up the Hole

SHREVEPORT. — Continental Oil Co.'s 1 P. C. Wideman, Claiborne Parish wildcat, acidized a new set of perforations at 7,530-80 ft., in the Smackover, swabbed acid water and fresh water, squeezed the holes and was waiting on cement. Total depth was 8,734 ft., and testing was to continue back up the hole.

In Grant Parish, Justiss-Mears 1 Erwin, 27-6n-2e, was reported pumping an estimated 50 bbl. of oil a day, plus 250 bbl. of salt water, from open hole in the Sparta at 2,424-30 ft.

Carter Oil Co. 1 Dowling, 19-18n-4e, Lincoln Parish Travis Peak wildcat, was below 7,170 ft. in shale. Sample top on the Travis Peak was 6,675 ft.

D. B. McConnell 1 Wilkerson, shallow Paluxy discovery south of Bull Bayou area of Natchitoches Parish, continued to test open hole at 2,810-30 ft., flowing 30 bbl. of 42°-gravity oil a day.

South of Dorcheat-Macedonia field of Columbia County, Arkansas, Lion Oil Co.'s 1 Whaley, new Smackover wildcat, was drilling in shale at 4,455 ft.

Stanolind Oil & Gas Co. 1-A Miller, Miller County, was drilling sand and shale at 5,822 ft.

NORTH LOUISIANA SUCCESSFUL WILDCAT

DeSoto Parish: Lyons, Prentiss & McCord 1 Sue Chaffin, SW SW SE 4-12n-14w, TD 3,302 ft., perf. Paluxy 2,949-54 ft., pumped 87 bbl. oil a day.

NORTH LOUISIANA WILDCAT FAILURE

Union Parish: Youngblood & Stewart 1 G. W. Bennett, 19-23n-2w, dry, TD 2,310 ft., elev. 173 ft.

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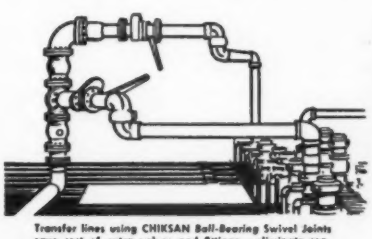

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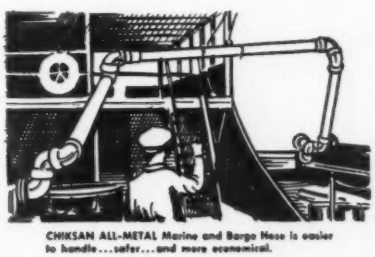

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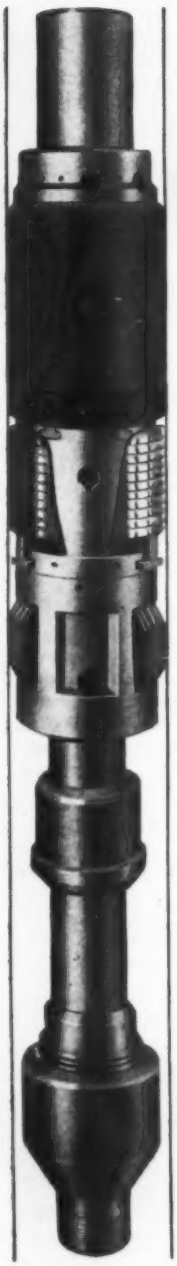

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Permian Basin

First Dean Sand Prospect Tested in Midland County

MIDLAND.—Southwest of Midland, Ralph Lowe 1 J. E. Hill, wildcat test projected to the Ellenburger, or 13,500 ft., had prospects of production from the Dean sand, of Permian age, which would be the only production from that zone, according to reports. The sand is in the lower Leonard group, and just above the Wolfcamp.

A 3-hour drill-stem test in the 1 Hill from 9,100-78 ft. had gas in 14 minutes. Fluid level in the drill pipe stood at 22 stands down, or about 2,000 ft. from surface. At that time the well started heading and operations were stopped to allow it to unload, after which oil in the pipe was to be reversed out. At last report there were no signs of formation water. Plans for drilling ahead were not determined.

Magnolia Petroleum Co. 1 Timmerman, Midland County deep test, topped the Devonian at 11,595 ft., minus 8,744 ft. Oil shows were logged in the formation from 11,766-868 ft. and tests were being made on that section. The well has already made a flow of oil from the Pennsylvanian at 10,455-535 ft.

In northern Dawson County, near the Lynn County line, Standard Oil Co. of Texas 1 Mrs. M. V. A. Smith recovered 4,780 ft. of clean 37°-gravity oil on a 5½-hour drill-stem test in Spraberry sand at 7,928-72 ft. Gas come to the surface in 17 minutes and operators were of the opinion it would have flowed oil if the tool had remained open longer. In addition to the clean oil, recovery included 720 ft. of oil and gas-cut drilling mud and 10 ft. of salt water. The 1 Smith was originally projected to 10,000 ft. in a search for the Pennsylvanian reef.

General American Oil Co. 1 R. L. Spires, 12 miles southwest of Clairemont in Kent County, had flowing oil from the Pennsylvanian on its second drill-stem test. The well is considered a wildcat but likely will be classed as a 1½-mile northwest extension to Sunray Oil Corp. 1 Spires, 400-bbl. Pennsylvanian discovery at 6,755-71 ft. It was drilled ahead to 6,924 ft. and a 50-minute test made at 6,884-6,924 ft. On the latest test at General American's well, gas showed in 3 minutes, mud flowed in 12 minutes, and oil in 15 minutes.

Star Oil Co. and others' 1 Blanche Young, southwest Kent County Ellenburger discovery, was ready for completion potential. On a 10-hour test it gaged 600 bbl. of clean oil from open hole at 7,782-7,822 ft. Top of the Ellenburger was 7,782 ft., on elevation of 2,372 ft.

WEST TEXAS (DISTRICTS 8 AND 7-C) SUCCESSFUL WILDCATS

Andrews County: Garrett M. Smith 1 McWhorter-Hall, 8-A29-PSL, 7½ mi. W Fullerton field, TD 7,508 ft., elev. 3,506 ft., Wichita Albany 7,336 ft., flowed 198 bbl. 37°-gravity oil a day, 14/64-in. choke, GOR 778 cu. ft., TP 385 psi.

Runnels County: John A. Messinger 1 Nora May Jones, Blk. 535, E. Mathers Sur., 5 mi. SE Winters, TD 4,108 ft., elev. 1,789 ft., Gardner sand 4,078 ft., flowed 134.55 bbl. 46°-gravity oil a day, 12/64-in. choke, GOR 800 cu. ft., TP 600 psi.

WEST TEXAS (DISTRICTS 8 AND 7-C) WILDCAT FAILURES

Coke County: Humble Oil & Refining Co. 1 N. L. Pruitt, 427-1A-H&TC, 3 mi. NE Bronte field, dry, TD 5,670 ft., elev. 1,859 ft., Strawn 4,882 ft., Ellenburger 5,453 ft.

Crane County: Texas Co. 1 W. E. Connell, 14-26-PSL, 2 mi. S C-Bar field, dry, TD 3,767 ft., elev. 2,698 ft.

Ector County: Anderson Prichard Oil Corp. 1 Fasken E-2, 32-41-T1N-G&MMB&A, 14 mi. NE Odessa, dry, TD 4,950 ft., elev. 2,960 ft., Yates 3,060 ft., Grayburg 4,670 ft.

Pecos County: C. W. Brown 1 State Na-

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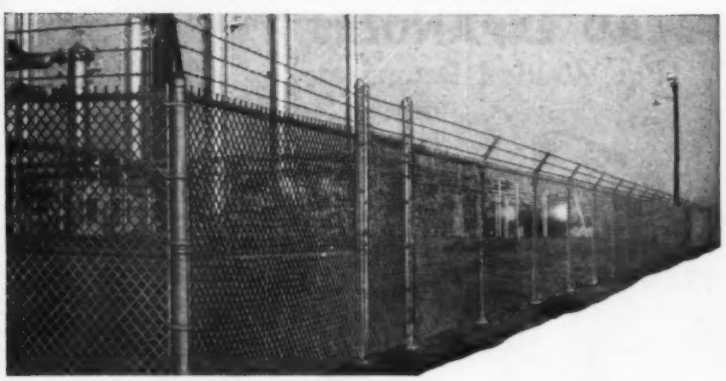

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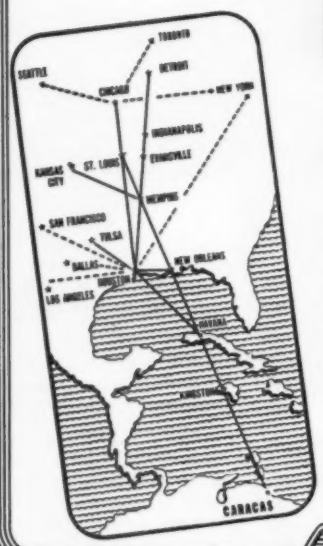

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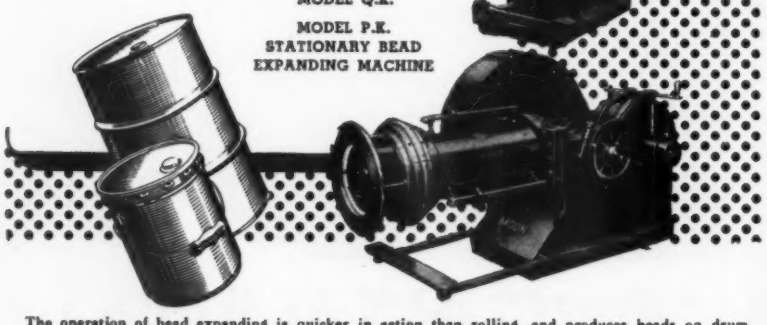

The operation of bead expanding is quicker in action than rolling, and produces beads on drum bodies deeper than is practicable by the rolling method. The bead is drawn up from the length of the drum without undue fatigue or crystallisation of the metal.

Write for full details.

Model Q.K. produces beads up to 1½ in. on dia.; drum capacity 10-16 in. dia.; centre of tool to back 15½ in.; 20 B.W.G. material.

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Model P.K. produces beads up to 2 in. on dia.; drum capacity 17¾-50 in. dia.; centre of tool to back 30 in.; 14 B.W.G. material.

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dm MB 31

tional Bank, 5½ mi. W Baldridge, dry, TD 1,625 ft.

Runnels County: Vincent & Welch, Inc., 1 P. M. Davis, Sec. 329, H&TC Sur., 2 mi. SE Winters, dry, TD 4,710 ft., elev. 1,849 ft., Strawn 1,954 ft., Ellenburger 2,779 ft.

Sutton County: Gem Oil Co. 1 Vanderstucken, 60-14-TW&NG Sur., 2 mi. S Shell 1 Wilson, dry, TD 5,900 ft., elev. 2,000 ft.

SOUTHEAST NEW MEXICO

HOBBS.—Ralph Lowe 1 Dickenson, 35-14s-37e, north outpost to the Denton field of northeast Lea County, was drilling ahead at 11,530 ft. in lime and shale after logging a show of oil from 11,393-500 ft. A 3-hour drill-stem test at that interval had gas in 2 hours and recovered 480 ft. of heavily gas-cut mud, plus 390 ft. of oil and gas-cut mud, said to be about 50 per cent oil. The section had not been identified at the time of the test. Top of the Mississippian has been placed at 10,814 ft.

Sinclair Oil & Gas Co. 1 Virgie Green, 13-12s-37e, northwest offset to McAlester Fuel Co.'s 1-A Brownfield, recent Devonian discovery, was running a drill-stem test between packer at 9,510-619 ft., total depth. The test had not been completed, but was making a light blow of gas.

SOUTHEAST NEW MEXICO SUCCESSFUL WILDCAT

Lea County: McAlester Fuel Co. 1-A Brownfield, 24-12s-37e, 15 mi. N Denton field, TD 12,035 ft., PB 11,875 ft., elev. 3,884 ft., Devonian 11,790 ft., perf. 11,785-11,840 ft., flowed 335 bbl. 46°-gravity oil a day, ¼-in. choke, GOR 61 cu. ft., TP 775 psi.

SOUTHEAST NEW MEXICO WILDCAT FAILURES

Chaves County: Amerada Petroleum Corp. 1-RA State, 22-8s-32e, TD 11,621 ft., elev. 4,373 ft., Wolfcamp 8,026 ft., Pennsylvanian 8,420 ft., Mississippian 10,370 ft., Devonian 11,018 ft., Ellenburger 11,410 ft., pre-Cambrian 11,594 ft.

Eddy County: Gulf Oil Corp. 1 Sams-State, 17-15s-33e, 3 mi. SW 1 Sounders, dry, TD 14,126 ft., elev. 4,221 ft., Wolfcamp 9,224 ft., Mississippian 13,282 ft., Devonian 14,046 ft.

Appalachian Field

Another Good Gas Well For Leidy Township

PITTSBURGH.—In Leidy Township, Clinton County, Pennsylvania, New York State Natural Gas Corp. completed N-190 Earl Connell, elevation 939 ft., gaging 18,500,000 cu. ft. of gas, 3,900 psi. in 24 hours. Onondaga lime 5,671 ft., Oriskany sand 5,696 ft., fas 5,696 ft., TD 5,697 ft. Godfrey L. Cabot, Inc. 1 Foley, elevation 1,339 ft., resulted in a day hole, Onondaga lime 6,512 ft., Oriskany sand 6,533 ft., salt water 6,540 ft., TD 6,542 ft. C. E. Fralich et al have commenced operations at 1 Clyde W. Peters. It is on the Hammersley Fork Quadrangle.

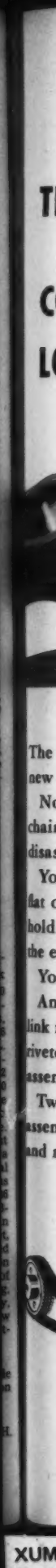
In Portland district, Preston County, West Virginia, William E. Snee completed 3 Cora E. Lewis, elevation 2,089 ft., with a final test of 1,160,000 cu. ft. of gas, Corniferous lime 5,076 ft., chert 5,098 ft., gas 5,133-5,136 ft. and 5,166-5,168 ft., Oriskany sand 5,348-5,582 ft., gas 5,348-5,402 ft., TD 5,551 ft. In the Limestone Hill section, Steele district, Wood County, W. & B. Gas Co. has located 1 L. D. Bonnett, elevation 787 ft. It is on the Belleville Quadrangle .95 mile south of Lat. 39°, .05′ and 2.70 miles west of Long. 81°, 30′. In Lee district, Mingo County, R. M. Kolze, Trustee, completed a shallow sand gas well in shale, 1 K. B. Stepp, testing 1,212,000 cu. ft., TD 4,004 ft.

PENNSYLVANIA WILDCAT FAILURE

Fayette County, Georges Township: Orville Eberly et al 1 N. E. Murphy, elevation 2,560 ft., dry, TD 8,032 ft.

MARYLAND WILDCAT FAILURES

Garrett County: Eberly & Snee 1 Geo. H.



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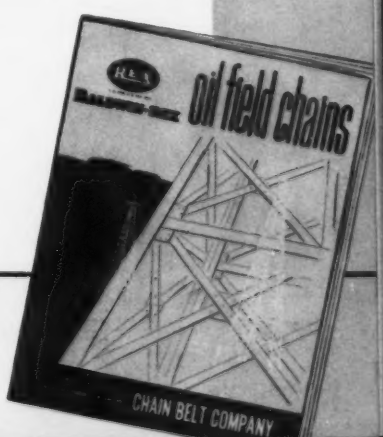
And, an important additional advantage . . . the other end of the single pin connector link is firmly riveted to the adjacent link. When the single pin connector is removed, this riveted pin holds chain parts together, preventing plates from falling out, thus simplifying assembly.

Two single pin connector links are assembled with each five feet of "BA" chain. This assembly, plus standard 3-pitch repair units, makes it easy for you to make adjustments and repairs in the field.

For the complete story on the Baldwin-Rex "BA" Assembly, Rex A.P.I. Chains and Rex Oil Field Pumps, see your local supply store or write Chain Belt Company, 1619 W. Bruce Street, Milwaukee 4, Wis.



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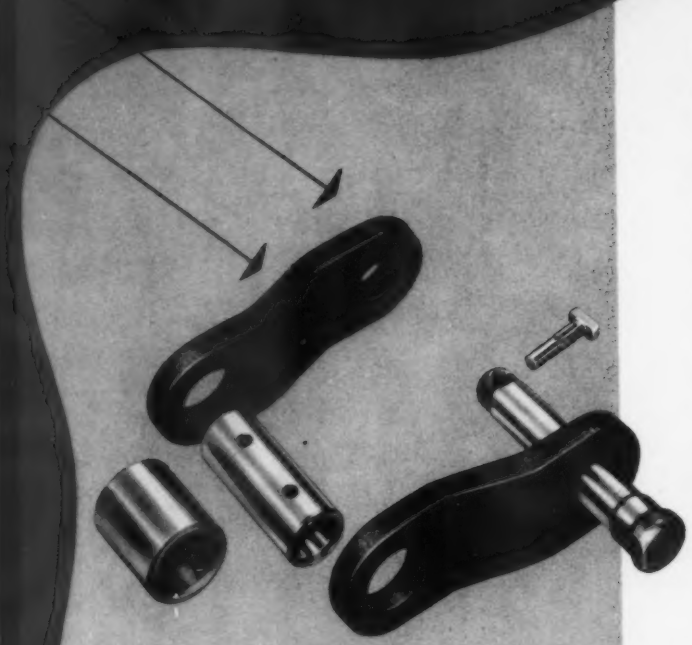

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WEST VIRGINIA SUCCESSFUL WILDCAT

Preston County: Portland district—William E. Snee 3 Cora E. Lewis, elev. 2,089 ft., 1,160,000 cu. ft. gas, TD 5,551 ft.

Oklahoma

Coal County Wildcat Tests Deep Gas Pays

TESTING is under way at Ohio Oil Co.'s prospective deep, gas-discovery well, I Jones, SE SE NW 35-3n-11e, southeast of Parker in eastern Coal County, in the southeastern part of the state. With casing perforated initially at 8,954-9,085 ft., opposite Bromide sand, the well flowed at the rate of 9,760,000 cu. ft. of gas per day, showing a trace of water. The Bromide zone had been logged from 8,742 ft. with sandy dolomite from 8,930 ft. Good gas showings were encountered at various intervals through the section. Hole was carried to a total depth of 9,836 ft. in Arbuckle lime, and then plugged back to the Bromide with no promising showings in the lower zone. The well is 1½ miles southwest of the shallow Ashland gas field.

W. H. Elson is completing his 1 Hesser, NE NE SW 4-19n-3e, 5 miles northeast of Stillwater, Payne County, as a Cleveland sand discovery well. Producing through casing perforations at 3,514-29 ft. in that sand, the well flowed initially at the rate of 5 bbl. of oil per hour through open tubing following a Hydrafrac application. Production later was gaged at approximately 80 bbl. of oil per day with a small amount of water. The well previously had tested salt water in the Red Fork sand, topped at 3,966 ft. The Wilcox, topped at 4,499 ft. and drilled to 4,538 ft., proved dry.

Productive area of the Ringwood pool in Major County has been widened another 1½ to 2 miles on its southwest flank. Mazda Oil Co. 1 Batman, NE NW NE 13-21n-11w, that distance from production to the northwest, northeast and southeast, flowed 115 bbl. of oil in 24 hours through ¾-in. choke for completion in the pool's Manning zone, opposite which casing had been perforated at 6,833-7,085 ft.

OKLAHOMA SUCCESSFUL WILDCATS

Carter County: New pay in Fox-Graham, Samedan 6 Ferguson, SW SW NE 33-2s-3w, elev. 1,099 ft., pumped 102 bbl. oil per day from Springer at 5,690-5,814 ft., TD 5,896 ft., fusilinid lime 3,380 ft., Tussy 3,833 ft., sand 3,802 ft., 3,852 ft., 4,070 ft., 4,174 ft., 4,526 ft., and 4,605 ft., Springer 5,180 ft.

Creek County: Extension to So. Skellyville—Central Oil Co. 1 Crow, SE SE SE 29-17n-10e, elev. 790 ft., flowed 60 bbl. oil per day from Dutcher at 2,682-85 ft., TD; Oswego 1,775 ft., Bartlesville 2,220 ft.

Lincoln County: Delaney Drilling 1 Lytle, NE NE SE 17-13n-5e, elev. 841 ft., flowed 44 bbl. oil per day from Prue 3,535-56 ft., TD; Hogshooter 2,333 ft., Checkerboard lime 2,710 ft., Oswego 3,509 ft.

Stephens County: Stanolind 1 Chickasaw Investment Co., SE SE SE 2-2s-4w, est. elev. 1,058 ft. DF, flowed 105 bbl. 35°-gravity oil per day from Simpson sand t 5,614-34 ft., TD 6,000 ft., Canyon 2,460 ft., fusilinid 3,770 ft., Tussy 4,030 ft., Springer 4,507 ft.

OKLAHOMA WILDCAT FAILURES

Beckham County: Kingwood Oil 1 Gordon, NE NE SW 20-10n-26w, elev. 2,021 ft., dry, TD 5,167 ft.

Carter County: Jones & Shelburne 1 Abbott, SW SW NE 7-4s-3w, elev. 975 ft., dry, TD 3,178 ft.

Cotton County: Christie & Stewart Drilling 1 King, NW SE SE 29-3s-9w, dry, TD 1,760 ft.

Garfield County: Deep Rock 1 Dunn et al, SE SE NE 15-23n-3w, est. elev. 1,032 ft., dry, TD 5,018 ft., Oread 2,798 ft., Tonkawa lime 3,025 ft., Tonkawa sand 3,095 ft., Hogshooter 4,017 ft., Layton 4,060 ft., Checkerboard 4,200 ft., Big lime 4,311 ft., Oswego 4,395 ft., Prue 4,509 ft., Verdigris 4,530 ft., Skinner 4,552 ft., Red Fork 4,600 ft., Viola 4,870 ft., Wilcox 4,944 ft., second Wilcox 4,985 ft.

Grady County: Wegener 1 Phipps, SW SW SE 1-3n-6w, elev. 1,282 ft., dry, TD 5,723 ft.

Hughes County: Walker 1-A Smith, NE NE SE 30-5n-9e, dry, TD 791 ft. in sand.

Jefferson County: Hedge 2 Brown, SW SE NE 22-6s-6w, elev. 820 ft., dry, TD 3,022 ft., Pontotoc-Hoxbar 1,185 ft., Palo Pinto 1,640 ft., Arbuckle 2,900 ft.

Lincoln County: Cox 1 Pruitt, EW SE SE 30-17n-5e, elev. 1,020 ft., dry, TD 3,983 ft., Skinner 3,585 ft., Red Fork 3,664 ft., Bartlesville 3,753 ft., Mississippi lime 3,934 ft.

Logan County: Trigg Drilling 1 Blake, NW NW NE 22-16n-2w, elev. 1,038 ft., dry, TD 6,059 ft., Oswego 5,232 ft., Mississippi lime 5,470 ft., Woodford 5,500 ft., Misener 5,580 ft., Hunton 5,600 ft., Sylvan 5,710 ft., Viola 5,808 ft., Wilcox 5,912 ft., second Wilcox 6,006 ft.

McIntosh County: Intex Oil 1 McKee, SW SW SE 18-10n-18e, elev. 670 ft., dry, TD 3,120 ft.

Osage County: R. O. & H. B. Neal 1 Osage, NW NE NE 4-27n-11e, dry, TD 1,101 ft. Lebow 1-A Osage, NE NE NW 16-25n-9e, elev. 965 ft., dry, TD 2,290 ft., Big lime 1,682 ft., Oswego 1,835 ft., Prue 1,935 ft., Bartlesville 2,150 ft., Mississippi lime 2,217 ft.

Eastern Texas

Tennessee Colony Field Has New Pay Discovery

DALLAS.—Continental Oil Co. completed its 2 Royal National Bank as a new pay discovery on the southeast outskirts of Tennessee Colony field, where production is in the Rodessa.

The outpost was drilled to 9,870 ft., then completed from perforations at 9,626-46 ft. in the Pettit limestone, flowing 492 bbl. of 53.4°-gravity oil a day through ¼-in. tubing choke. Gas-oil ratio was 1,747 cu. ft., and flowing tubing pressure was 1,380 psi.

In the field proper, the upper Rodessa produces 46°-gravity oil, while the lower section of the same formation yields distillate.

A 7-mile southeast extension to the Buffalo gas field of Leon County, or possible new structure, was in prospect at Lone Star Producing Co. 1 Page Estate "C," which blew out while operators were pulling drill pipe. The zone causing the sudden blow of gas was not immediately determined, but it was believed to be the Woodbine, which produces gas in the Buffalo field.

Total depth of the 1 Page was 7,395 ft., and at the time of the blowout there was still some 6,000 ft. of pipe in the hole. At last report the well was under control.

EAST TEXAS (DISTRICTS 5, 6 AND 6-P) WILDCAT FAILURES

Denton County: James Papadakis 1 W. W. Smith, J. C. P. Melton Sur., 3½ mi. N NE Krum, dry, TD 2,884 ft.

Voth Bros. Drilling Co. 1 A. B. Holt, H. Qierwester Sur., A-1241, ½ mi. W Sanger, dry, TD 1,776 ft.

Witherspoon & McCarty 1 Burkholder, A. H. Lynde Sur., A-731, 3 mi. NE Bolivar, dry, TD 1,700 ft., elev. 684 ft.

Henderson County: B. B. Banner 1 J. J. Hearn, Nathan Parsons Sur., 3 mi. W Tool, dry, TD 801 ft.

Houston County: J. B. Moore 1 J. C. Yarborough, Stephen Bros. Sur., A-17, 9 mi. SW Crockett, dry, TD 7,896 ft., elev. 297 ft.

Navarro County: Coffield & Guthrie 1 R. E. Tatum, Wilson Reed Sur., 2 mi. SE Navarro, dry, TD 3,160 ft., elev. 344 ft.

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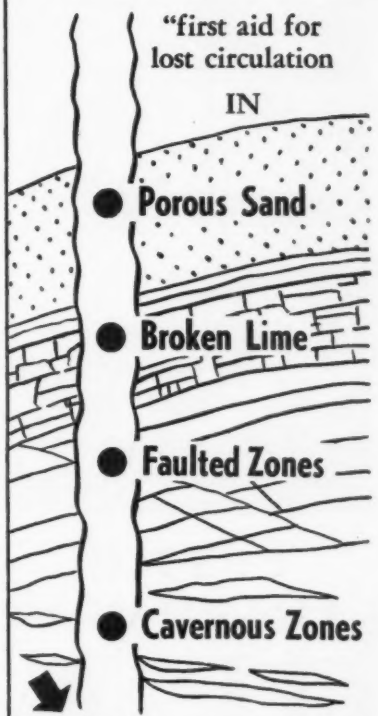

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HOUSTON, TEXAS . . . NEW ORLEANS, LA.

Red River County: C. W. Whitehead 1 T. E. Allen, Benjamin Gooch Sur., 1 mi. S Bagwells, dry, TD 1,972 ft.

Smith County: Guy V. Lewis 1 Fraser, B. L. Dupree Sur., A-296, 2 mi. NW Arp, dry, TD 4,170 ft.

Van Zandt County: Sinclair Oil & Gas Co. 1 Ben Curtis, T. J. Stansbury Sur., A-823, 5 mi. E Edom, dry, TD 10,500 ft., elev. 567 ft.

Rocky Mountain

Johnson County, Wyoming, Has New Deep Producer

DENVER.—An important new discovery in the Meadow Creek-Sussex area, Johnson County, Wyoming, was made east of the previous producing area this week. American Liberty Oil Co. 1 Irvine, NW NW NW 7-41n-77w, 1½ miles east of the closest producer, flowed on drill-stem test of the Lakota sand. Top of Lakota is 7,472 ft. and the test was made between 7,475-92 ft. There was gas to the surface in 5 minutes with 7,400 ft. of oil recovered on the 1-hour test. The well cleaned itself as tester was pulled, and flowing pressure built up from 505 to 920 psi. on the test. This well is lower structurally than any other producing well in the four Meadow Creek-Sussex pools, and faulting is indicated between this well and the closest producer in the Meadow Creek unit.

Shows of oil in the Phosphoria may indicate a new discovery for the Big Horn Basin of Wyoming. British-American Oil Producing Co. 1 Melton, SW SW NW 5-43n-94w, topped Phosphoria at 3,351 ft., and cores in that formation showed solid saturation to 3,365 ft. On drill-stem test of the zone 3,550-65 ft. with tool open 1 hour, the recovery was only 2 ft. of free 28°-gravity oil. An additional 15 ft. of saturation was cored and on test the recovery was 4 ft. of free oil with mud. British-American is now running casing for completion tests following acid treatment of the lime zone. This wildcat is on the flank of the Lucerne structure, southeast of Gebo field on the south side of the Big Horn Basin.

The J. M. Huber Corp. discovery at 1 Government-Smith, SE SW NW 1-2n-57w, found a total of 12,300,000 cu. ft. of gas daily in both Dakota and Muddy formations. This well is a ½-mile northeast extension in the Lee area, Morgan County, Colorado, where there are now two Muddy sand oil producers.

This is the first gas completion in the current Denver-Julesburg basin area play in Colorado, although there are three gas pools across the line in Nebraska.

Another gas discovery was completed in Wyoming. British-American Oil Producing Co. 1 Government, C NW NE 5-31n-94w, wildcat in Longs Creek area, Fremont County, for 6,470,000 cu. ft. daily from the Phosphoria after acidizing with 1,000 gal. This well was suspended a year ago after failing to find production through Madison, and British-American recently reworked the well and perforated casing between 5,191-5,222 ft. in the Phosphoria for the new completion.

WYOMING SUCCESSFUL WILDCAT

Deep Creek, Carbon County: Amerada Petroleum Corp. 1 Unit, C SW SE 30-16n-90w, TD 8,257 ft., flowed 3,728,000 cu. ft. gas per day.

WYOMING WILDCAT FAILURES

East Lamb, Big Horn County: Gulf Oil Corp. 1 Government, C NW SE 31-52n-92w, dry, TD 5,041 ft.

Sweetwater Unit, Fremont County: C. F. Freeman 3 Government, NW SE NW 21-29n-96w, dry, TD 1,681 ft.

Badwater, Natrona County: The Pure Oil Co. 1 Unit, SE NE NW 35-29n-89w, dry, TD 15,172 ft.

East Salt Creek, Natrona County: Tracy Drilling Co. and Pyramid Oil Co. 1 Government, SW SE SE 18-40n-78w, dry, TD 3,230 ft.

MONTANA WILDCAT FAILURES

Sult Area, Garfield County: P. L. Ferguson 1 Sult, SE SE NW 35-16n-31e, dry, TD 1,800 ft.

Liberty Hills, Liberty County: The Texas Co. and Union Oil 1 Northern Farms, C NE NW 24-37n-6e, dry, TD 3,626 ft.

East Vanada, Rosebud County: The Texas Co. 1 Lorigan, C NW SW 17-7n-38e, dry, TD 6,712 ft.

UTAH WILDCAT FAILURES

Argyle Canyon, Duchesne County: McCarthy Oil & Gas Co. 1 Fee, NE NE NW 14-11s-12e, dry, TD 2,240 ft.

South Cisco, Grand County: Wise Oil Co. 1 State, SE SE SE 19-21s-24e, dry, TD 367 ft.

Ohio Fields

Everett Company Gets Good Gas Well

COLUMBUS.—C. H. Everett Co. 5 J. F. Ford, Section 2, Reading Township, Perry County, gaged 200,000 cu. ft. of gas with a small show of oil, natural. In 10 minutes after a 90-qt. shot, the well was turned into the line with a gage of 1,900,000 cu. ft. In Hopewell Township, L. L. Dittoe et al., 6 Swinehart, Section 27, logged Clinton at 2,906-46 ft. with a 20-bbl. showing, natural.

In New Castle Township, Coshocton County, Pure Oil 1 R. J. Daliere, third quarter, was drilled in with 35 bbl. in 42 hours, natural. Mossholder Drilling 1 Ida Williams, third quarter, found Clinton at 3,282-3,315 ft. with only a small showing

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of oil and gas. After being shot, it was shut in as a gas well with 250,000 cu. ft.

Hanley & Bird have plugged their sub-Trenton test on Johnson in Section 17, New London Township, Huron County, at 4,103 ft. Dave Shafer is testing a small gas showing in first white Clinton at 3,707-20 ft. in a wildcat on Earl Galley, Section 10, Mechanic Township, Holmes County.

OHIO WILDCAT FAILURES

Carroll County, Monroe Township: Status Development Co. 1 R. J. McIntyre, Sec. 29, Clinton 5,598-5,690 ft., dry, TD 5,715 ft.

Summit County, Springfield Township: Ed Obermiller et al., 1 Charles Bodemer, Lot 24, Clinton 4,200-4,306 ft., dry, TD 4,340 ft.

Illinois-Ind.-Ky.

Union County Wildcat Makes Small Oil Well

A W. CHERRY and George & Wrather and associates expect to make a small well in their 1 Tom Richards, a wildcat in 19-O-17, extreme western Union County, Kentucky. Testing showings found in Waltersburg sand at 1,872-82 ft., the well swabbed initially at the rate of 10 bbl. of oil per day while cleaning out after a 20-qt. nitro shot. In an attempt to improve production, operators since have reshot the pay and at latest report were cleaning out with no estimate of production.

The location is about a mile southeast of Shawneetown, across the Ohio River in Illinois. Nearest production is in the small Raleigh pool, about 4 miles to the northeast. The more important Spring Grove pool lies about 6 miles east.

About 5 miles to the north in Gallatin County, Illinois, and about a mile south of production in the Inman pool, Vandenback Brothers and associates appear to have made another oil discovery at their 1 Lawrence Drone, NW SE NW 31-8s-10e. In a drill-stem test of saturation found in Aux Vases sand at a total depth of 2,746 ft., the well flowed clean oil. No estimate was made but oil was at the surface within 25 minutes after the tester was open. Casing has been run for completion.

Approximately 2½ miles to the northwest in the area between the Inman South and Junction North pools, same county, Oil Management, Inc., also has a prospective producer in their 2 Schmidt, SW NE SE 27-8s-9e, which found good saturation in the Aux Vases zone at 2,787-97 ft. The well got a substantial showing of gas and recovered 100 ft. of clean oil in a drill-stem test of that interval. Tester was open 1 hour and gas was at the top within 32 minutes. Casing has been run to 2,775 ft.

Ryan Oil Co. 1 Stinnett, SE NE NW 25-M-23, a mile east of production in the Dixon area, Webster County, Kentucky, is giving indications of a good oil discovery in O'Hara lime at 3,109-13 ft. A 60-minute drill-stem test of this interval yielded 2,230 ft. of clean oil and 120 ft. of oil-cut mud with no indication of water. Tester was open 1 hour. The test had gas within 2 minutes. Total depth is 3,215 ft. with casing run through the above pay zone.

C. J. Simpson 1 Bonnell, NW NE NE 15-4n-1w, a wildcat 5 mi.es northwest of production in the Patoka pool, Fayette County, Illinois, swabbed 3 bbl. of oil with 5 bbl. of water per hour while cleaning out after a shot in testing Cypress sand at 1,420-25 ft., and should make a small pumper.

Production at the north end of the South Rural Hill pool, Hamilton County, Illinois, is being extended a quarter mile to the east at Dale Hopkins 1 Moore, NW SW SW 25-6s-5e. The well flowed clean oil and had a substantial showing of gas in a drill-stem test of Aux Vases sand at 3,179-87 ft. It has casing run to 3,170 ft. for production tests. The area is 2 miles northeast of the town of Rural Hill.

North of Rural Hill production in the area 4 miles southwest of McLeansboro, same county, Stewart Oil Co. 1 Porter, NW SW SE 1-6s-5e, swabbed 157 bbl. of oil natural in a 24-hour run while starting tests of saturation in Aux Vases sand at 3,176-3,214 ft. Since then, the pay has been given a 100-qt. shot and at latest report was cleaning out with production improving.

Skiles Oil Corp. 1 Harl, SE NE SW 21-2s-9e, 2 miles south of Goldengate, Wayne County, Illinois, and about a mile from production in the Goldengate Consolidated pool, got a good gas showing and oil flow in a drill-stem test of O'Hara lime. Interval tested was at 3,288-91 ft. Casing has been run for completion.

ILLINOIS SUCCESSFUL WILDCAT

Richland County: Sanders & Fye 1 Wells, NW SW SE 3-2n-10e, IP 8 bbl., McClosky 3,278-81 ft., TD 3,284 ft.

ILLINOIS WILDCAT FAILURES

Clay County: Sam Mabis 1 Van Dyke, SE SE SW 3-5n-6e, dry, TD 2,895 ft.

Edgar County: National Associated Petroleum Co. and Continental Oil Co. 1 Moody, SW NW SW 9-14n-11w, dry, TD 1,046 ft.

Gallatin County: S. L. Dedman 1 Hamilton et al., NW NW NE 10-9s-8e, dry, TD 2,870 ft.

G. L. Reasor 1 Smith, SW SW SE 27-9s-9e, dry, TD 2,717 ft.

Lawrence County: G. Sturm & Sons 1 Simmons, NW NW SW 23-3n-13w, dry, TD 2,420 ft.

Logan County: G. H. Hubbard 1 Begalka, NE NE NE 18-19n-3w, dry, TD 1,323 ft.

Madison County: Spade Drilling Co. 1 Brown, NE NE NW 4-5n-5w, dry, TD 908 ft.

Morgan County: G. D. Whiteside 1 Neuman,

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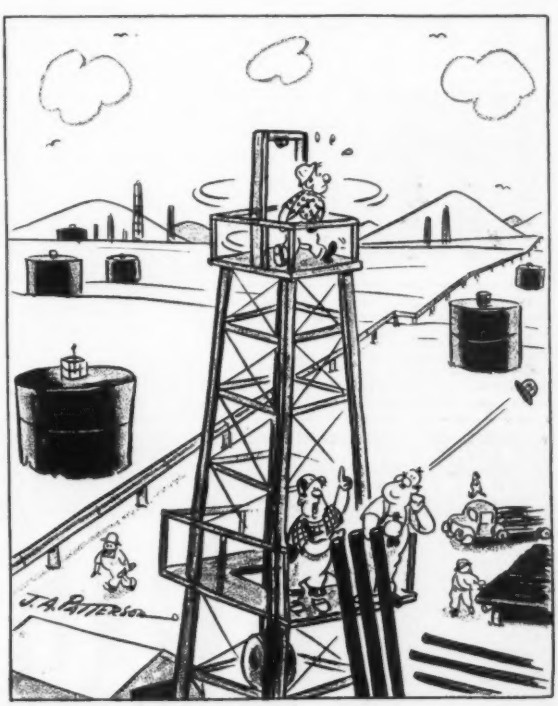

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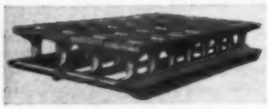

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Further Detailed Information Upon Request

NW SE SW 9-13n-8w, dry, TD 1,096 ft.
Moultrie County: E. A. Obering 1 Reuss, SW SW NW 32-14n-4e, dry, TD 3 000 ft,
Piatt County: McDowell & Murvin 1 Saunders, SE SW SE 6-19n-5e, dry, TD 1,382 ft.
Wayne County: Arvin Drilling Co. 1-A Bratton, SE SW SW 9-1n-6e, dry, TD 3.314 ft.
Davis & Johnson 1 Winters, SW SW SW 13-2s-9e, dry, TD 3.399 ft.

INDIANA SUCCESSFUL WILDCATS
Daviess County: N. Stoner and R. C. Baker 1 Neukom, SW SW SW 17-2n-5w, IP 10 bbl., Aux Vases 835-40 ft., TD 840 ft.
Dubois County: Gale & Walters 1 Struckman, NE NE NW 17-3s-5w, IP 12 bbl., Rosiclare 922-25 ft., TD 925 ft.
Gibson County: L. Galambos, Trustee, et al., 1 Anna B. Phillips, SW SW SE 9-3s-13w, IP 95 bbl., Mansfield 1,178-86 ft., TD 1,186 ft.

(Continued on page 170)

Mississippi

Jefferson County Has Possible Wilcox Discovery

JACKSON.—A new Wilcox discovery is in the process of being completed in southwestern Jefferson County, Mississippi, approximately 4 miles north of Pine Ridge field of Adams County. Robert Oil Co. and Lyle Cashion 1 Davis Heirs, 41-9n-2w, was perforated 5.535-37 ft. in the Artman (Wilcox) sand. On initial test, the well flowed an estimated 4 bbl. of oil and wash water per hour through 16/64-in. choke, with tubing pressure of 100 psi. Next gage, through an ⅛-in. choke, was estimated at the rate of 6 bbl. of 44°-gravity oil per hour. A later test was made using 12/64-in. choke, but no estimate was made of rate of flow. Some wash water was being recovered. Tubing pressure climbed to 360 psi. and casing pressure to 700 psi.

A possible Wilcox discovery is being tested in Adams County, Mississippi, at R. J. Bartlett and Barnett Serio 1 George W. Armstrong, 37-6n-3w, approximately 3¾ miles north of Glen Aubin field. This wildcat was drilled to total depth of 6,763 ft. and electric log run. Sidewall samples were taken. Good shows of oil were recovered in samples from top 5 ft. of sand just below the Baker shale zone. Casing was cemented in the well at 6,440 ft. and perforated at 6,327-29 ft. When christmas tree was hooked up, the well started flowing 41.8°-gravity oil by heads. At last report, the well had died and operators were preparing to swab.

MISSISSIPPI WILDCAT FAILURES
Adams County: Placid Oil Co. 2 U. S. A., 55-5n-1w, dry, TD 7.005 ft.
Lamar County: The Texas Co. 1 J. F. Morrow, 26-3n-15w, dry, TD 9,496 ft.
Neshoba County: Harry W. Elliott et al 1 Mrs. Laura Eakes, 36-11n-13e, dry, TD 5,430 ft.
The Pure Oil Co. 1 A. S. Rea, 36-11n-12e, dry, TD 5,612 ft.
Scott County: Clyde Moss and Fred Mellen 1 Sullivan L. Latham, 21-8n-6e, dry, TD 9,405 ft.

Canadian Fields

D2 Discovery Reported SE of Leduc-Woodbend

CALGARY.—A D2 Devonian zone oil discovery is indicated at Locksley-Kavanaugh 1, wildcat in LSD 13, 4-49-25w4, about 3 miles southeast of Leduc-Woodbend limits. No official information on the test results have yet been received, but unofficial reports indicate that the well is flowing clean, light oil by heads after treatment of D2 zone with 2,000 gal. of acid. Due to the nature of the flow it isn't yet possible to indicate a potential. The wildcat had been drilled to 5,700 ft., in search of D3 reef, but that objective failed to show. Casing was run and the well plugged back for D2 zone test.

A natural gas discovery has been made in northwest Alberta, about 50 miles south of the Normandville Devonian oil discovery and 65 miles east of Grande Prairie. The discovery, Pacific-Valleyview 1, is shared by 15 Canadian independents and the Benedum and Trees interests. Located in LSD 11, 33-70-21w5, the well found natural gas in Peace River sands, equivalent to Viking sand of central Alberta and Bow Island sand in the southern sector of the province. The gas zone was topped at 2,955 ft., and drill-stem test from 2,942-70 ft. gave a maximum flow rate of 3,400,000 cu. ft. daily.

Richfield Petroleums, Ltd., flowed oil during drill-stem test in Lower Cretaceous at its initial venture in the Campbell area, about 6 miles north of Edmonton. The well, located in LSD 6, 22-54-25w4, ran test from 3,717-47 ft. and received a flow of oil to surface in 8 minutes. Site is about ¾ of a mile southeast of High-Crest-Long Island 1, nearest producer, and ½ mile southeast of the recent Redwater Leaseholds 8 failure.

Imperial Oil, Ltd., has found water at its key well in southwest Leduc that found commercial D3 oil production in an area that had previously yielded only D2 oil producers. Imperial-Leduc 280, LSD 11, 6-50-26w4, topped D3 at 5,390 ft., and completed in that zone after finding 7 ft. of gas cap and 6 ft. of oil pay above the water line. Crew is now gun-perforating D3 productive section and preparing the well for production tests.

CANADIAN WILDCAT FAILURES
Great Plains-Seaboard-Smokey Lake 2 LSD 14, 12-60-18w4, TD 3,335 ft.
National-Calvan-Tower 1, LSD 9, 25-3-23w4, TD 6,106 ft.

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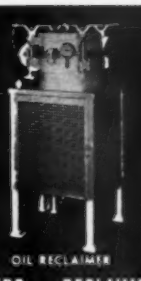

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Wells and Footage Drilled First Nine Months Reflect Gains Over Last Year

by Polly DeArmond

PRELIMINARY cumulative figures for 9 months' activity this year reflect gains in both number of wells completed and in total depth drilled as compared with those for the same period last year. Completions totaled 32,051, an increase of 3,091 wells, or 10.7 per cent. Footage reached 116,803,303 ft., an increase of 13,205,763 ft., or 12.7 per cent. Some 63 per cent of the wells found oil or gas—about the same ratio of successful completions as in the corresponding period in 1949.

If this high rate of activity continues, 1948's all-time peak number of completions, and 1949's all-time footage record will be toppled, as the revised schedules forecast in The Oil and Gas Journal's Midyear Report, July 27, 1950.

Percentagewise, the Mid-Continent district paced the increased activity in the first three quarters. The Oklahoma - Kansas - Nebraska - Missouri group was up 1,386 completions, or 24.5 per cent, and up 4,516,397 ft., or 23.4 per cent, in footage. Slightly deeper operations were evidenced in the Texas and New Mexico area, which accounted for 2,076 additional wells, or 19.6 per cent, over last year, with an accompanying increase of 9,826,948 ft., or 21.8 per cent.

The North Central states of Ohio, Indiana, Kentucky, Illinois, and Michigan reported somewhat shallower completions for the period this year. Completions were up 541 wells, or 10.5 per cent, while footage gained 453,843 ft., or 4.1 per cent.

Louisiana, Arkansas, Mississippi, Tennessee, Alabama, Georgia, and Florida reflected decidedly deeper drilling. This group recorded increases of 142 completions, or 6.2 per cent, and 1,426,247 ft., or 11.5 per cent, compared with last year.

East and West Areas Decline

A rather steady decline in drilling on the Pacific Coast accounted for a 634 loss in wells, or 32.6 per cent, and a 2,409,014-ft. drop in footage, or 29.7 per cent, from the figures for January through September 1949.

The next largest decreases were noted in the Eastern area, comprised of New York, Pennsylvania, and West Virginia. These states were off 379 completions, or 14.8 per cent, and 562,697 ft., or 12.3 per cent, from last year.

The Rocky Mountain region, including Montana, Wyoming, Colorado, Utah, and the Dakotas, was down 41 wells, or 5.4 per cent, but only 45,861 ft., or 1.5 per cent.

1950 Standings

In completions, September ranks as the third most active month this year. Wells were down 393, or 9.5 per cent, from the record established in August, and were 132, or 3.4 per cent, under the second highest figure reported in July.

In total depth drilled, September occupies fourth place. Footage was down 1,780,299 ft., or 11.8 per cent, from the mark set in August. It declined 1,506,925 ft., of 10.1 per cent, from the second-ranking month of June, and was off 61,294 ft., or 4.5 per cent, from the third highest month of July.

SUMMARY OF COMPLETIONS—SEPTEMBER 1950

	Total comp.	Oil	Gas	Dry	Under 2,500 ft.	2,500-5,000 ft.	5,000-7,500 ft.	7,500-10,000 ft.	10,000-12,500-ft.	Over 12,500 ft.	Total footage	Rigs and drilling
New York	53	26	0	27	53	0	0	0	0	0	76,000	64
Pennsylvania	134	66	14	54	127	7	0	0	0	0	218,473	289
West Virginia	47	6	33	8	27	15	5	0	0	0	132,173	§188
Ohio	100	34	30	36	54	46	0	0	0	0	214,438	147
Kentucky	127	56	14	57	106	21	0	0	0	0	234,974	97
Illinois	316	156	2	158	157	159	0	0	0	0	716,213	317
Indiana	168	56	12	100	144	24	0	0	0	0	282,857	179
Michigan	96	26	7	63	54	41	1	0	0	0	232,296	163
Kansas	348	153	41	154	63	284	1	0	0	0	1,019,254	400
Neb., Mo., Iowa	26	14	1	11	10	14	2	0	0	0	95,139	31
Oklahoma	435	263	10	162	132	200	85	3	15	0	1,553,461	762
Texas	1,319	846	51	422	336	459	386	120	13	5	5,861,658	1,330
North	221	114	1	106	117	74	30	0	0	0	645,974	195
West Central	153	76	5	72	73	63	17	0	0	0	432,893	116
West	420	338	2	80	67	108	203	34	5	3	2,209,688	449
Panhandle	67	51	12	4	5	61	0	0	1	0	206,788	111
East	73	53	4	16	12	33	18	10	0	0	339,031	76
Gulf Coast	192	103	17	72	11	56	66	51	6	2	1,168,495	218
Southwest	193	111	10	72	51	64	52	25	1	0	858,789	165
Louisiana	195	109	13	73	60	38	27	32	33	5	1,107,148	251
Northern	107	65	10	32	59	29	10	6	3	0	337,307	100
Southern	88	44	3	41	1	9	17	26	30	5	769,841	151
Arkansas	36	23	0	13	12	21	2	1	0	0	110,035	39
Mississippi	23	7	1	15	0	2	13	5	3	0	165,256	27
Ala., Ga., Fla., Tenn.	¶5	1	0	4	¶3	1	1	0	0	0	12,809	¶15
Montana	37	19	1	17	30	6	1	0	0	0	75,527	57
Wyoming	60	38	4	18	5	27	18	7	1	2	319,402	‖150
Colorado	17	1	3	13	7	2	7	1	0	0	68,187	38
Utah	3	1	0	2	0	0	2	1	0	0	21,764	18
New Mexico	52	31	10	11	14	24	10	3	1	0	211,867	**143
California	††153	99	10	††44	32	78	24	††11	7	1	691,852	181
Dakotas	6	0	0	6	3	2	0	1	0	0	22,896	4
Total September 1950	3,756	†2,031	257	*1,468	1,429	1,471	585	185	73	13	13,443,679	‡4,890
Total August 1950	4,149	2,315	267	1,567	1,512	1,679	630	225	88	15	15,037,930	4,911
Total September 1949	3,552	1,984	298	1,270	1,413	1,395	481	168	82	13	12,656,833	4,543
Cumulative 1950	32,051	18,188	2,097	11,766	11,841	12,737	5,002	1,646	721	104	116,803,030	....
Cumulative 1949	28,960	16,359	2,108	10,493	10,937	11,868	3,795	1,547	713	100	103,597,267	....

*Incl. 93 service wells: N. Y. 27, Pa. 51, Ohio 3, Ill. 2, Mich. 1, Okla. 7, W. Cent. Tex. 1, Tex. Gulf 1. †Incl. 22 distillate wells: Okla. 1, W. Tex. 4, Tex. Gulf 3, S.W. Tex. 6, No. La. 3, So. La. 4, Miss. 1. ‡Incl. all wells rigged up and/or drilling at end of month. §Incl. 3 Md. and 2 Va. ¶Incl. 1 oil and 2 dry Tenn. comp. at 2,850 ft. and 7 rigs. ‖Incl. 3 Idaho. **Incl. 5 Ariz. ††Incl. 1 Wash. comp. at 9,344 ft.

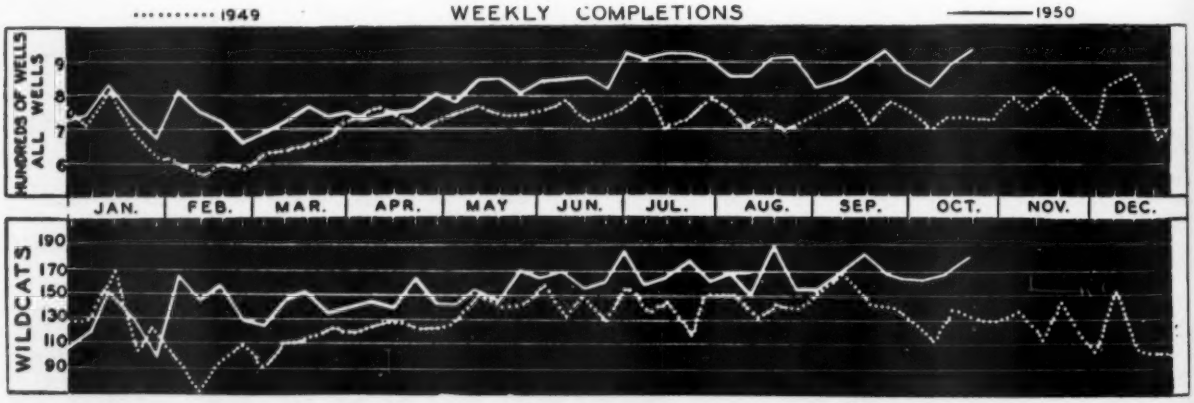
CURRENT STATISTICS

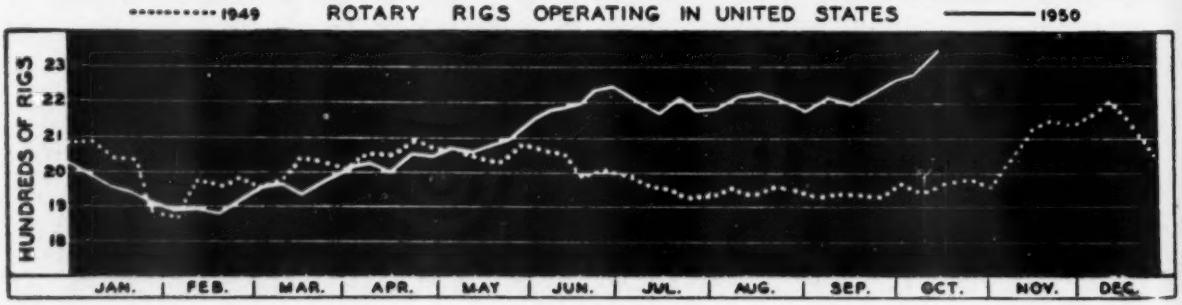
EXPLORATION

WEEKLY WELL COMPLETIONS . . . . . WEEK ENDED OCTOBER 21, 1950

	Total of all wells					Oct. 21		Wildcat completions and discoveries					Cumulative total, 1950				
	Comp.	Oil	Gas	Dry	Footage	1950	1949	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	14	7	0	*7	20,384	558	814	0	0	0	0	0	0	0	0	0	0
Pennsylvania	28	11	3	†14	45,133	1,090	1,319	0	0	0	1	1	0	0	1	3	4
West Virginia	8	2	6	0	29,017	534	398	0	0	1	0	1	0	0	20	17	37
Ohio	25	1	10	‡14	51,441	824	890	0	0	0	2	2	2	0	2	12	16
Indiana	35	10	1	24	58,788	1,342	1,096	4	0	0	9	13	49	0	1	213	263
Kentucky	33	15	3	15	61,830	952	778	0	0	0	4	4	23	0	1	81	105
Illinois	78	32	0	46	165,323	2,263	2,091	1	0	0	12	13	46	0	2	490	538
Michigan	22	9	2	11	55,570	717	818	1	0	1	6	8	31	0	5	242	278
Kansas	117	46	28	§43	354,350	3,116	2,626	5	0	0	19	24	94	0	11	514	619
Nebraska	0	0	0	0	0	100	22	0	0	0	0	0	6	0	2	46	54
Oklahoma	106	61	2	43	361,121	4,366	3,457	4	0	0	12	16	133	6	15	537	691
Texas	317	205	19	93	1,467,771	13,192	10,846	8	1	3	49	61	406	38	97	2,093	2,634
North Central (Dist. 7B & 9)	71	41	2	28	229,491	3,993	3,603	4	0	1	10	15	179	2	28	823	1,032
West (Dist. 7-C & 8)	93	81	1	¶11	532,466	3,963	2,613	2	0	0	6	8	80	2	4	397	483
Panhandle (Dist. 10)	18	11	6	1	56,674	744	783	0	0	0	0	0	1	0	2	15	18
Eastern (Dist. 5, 6, & 6-P)	38	19	2	¶17	169,761	933	695	0	0	0	9	9	15	5	3	160	183
Gulf Coast (Dist. 2 & 3)	47	27	3	17	249,061	1,852	1,597	1	1	1	11	14	68	18	35	312	433
Southwest (Dist. 1 & 4)	50	26	5	19	230,318	1,707	1,555	1	0	1	13	15	63	11	25	386	485
Louisiana	49	31	5	13	280,150	1,973	1,915	1	1	0	3	5	41	16	6	172	235
Northern	26	15	5	6	83,338	1,056	1,140	1	0	0	1	2	9	3	2	81	95
Southern	23	16	0	7	196,812	917	775	0	1	0	2	3	32	13	4	91	140
Arkansas	3	3	0	0	9,669	324	269	0	0	0	0	0	10	0	0	74	84
Mississippi	7	1	0	6	49,869	255	280	0	0	0	5	5	9	2	0	95	106
Southeastern States	1	0	0	1	3,409	49	42	0	0	0	0	0	1	0	1	27	28
Montana	20	14	0	6	42,624	214	212	0	0	0	3	3	1	0	0	35	36
Wyoming	13	6	1	6	74,326	472	468	0	0	1	4	5	19	0	1	69	89
Colorado-Utah	2	0	0	2	2,607	79	116	0	0	0	2	2	4	0	2	52	58
New Mexico	7	5	0	2	54,224	498	416	1	0	0	2	3	11	1	3	45	60
California	46	27	5	14	175,497	1,442	2,095	0	0	0	13	13	21	0	3	309	333
Miscellaneous	‖3	0	0	3	12,904	45	23	0	0	0	3	3	0	0	0	20	20
Total United States	934	486	85	363	3,376,007	34,405	30,991	25	2	6	149	182	907	63	173	5,146	6,289
Total previous week	894	484	64	346	3,268,136	33,471	30,242	30	1	7	130	168	882	61	167	4,997	6,107
Total October 21, 1949	749	407	57	285	2,612,821	....	....	13	2	2	114	131	765	73	161	4,514	5,513

Service wells included: *7, †11, ‡3, §2, ¶1. ‖Incl. 2 Md. at 10,155 ft. and 1 Mo. at 2,749 ft.





DAILY AVERAGE PRODUCTION FOR WEEK

	Oct. 21 crude oil	B. of M. Oct. demand	Oct. 14 crude oil
Alabama	2,300	1,600	2,300
Arkansas	82,750	90,000	81,740
California	936,900	930,000	932,800
Colorado	64,600	67,000	64,100
Eastern	63,800	65,000	64,900
Florida	1,475	1,400	1,575
Illinois	178,600	188,000	178,400
Indiana	31,800	31,000	30,800
Kansas	309,800	308,000	299,350
Kentucky	29,300	30,000	28,400
Louisiana	581,600	600,000	560,680
North Louisiana	116,600	.....	115,680
South Louisiana	465,000	.....	465,000
Michigan	44,300	47,000	42,400
Mississippi	108,950	120,000	107,170
Montana	22,200	24,000	23,000
Nebraska	4,700	5,000	3,400
New Mexico	131,825	154,000	131,825
Oklahoma	487,300	470,000	475,800
Texas	2,570,725	2,330,000	2,570,725
Dist. 1 (Southwest)	31,000	.....	31,000
Dist. 2 (Southwest)	150,050	.....	150,050
Dist. 4 (Southwest)	233,250	.....	233,250
Dist. 3 (Gulf Coast)	450,875	.....	450,875
Dist. 5 (Eastern)	42,950	.....	42,950
Dist. 6 (Eastern)	102,225	.....	102,225
East Texas field	296,000	.....	296,000
Dist. 7-C (West)	70,800	.....	70,800
Dist. 8 (West)	870,550	.....	870,550
Dist. 7-B (W. Central)	78,700	.....	78,700
Dist. 9 (N. Central)	154,325	.....	154,325
Dist. 10 (Panhandle)	90,000	.....	90,000
Utah	3,700	4,000	3,800
Wyoming	164,900	174,000	165,000
Canada	99,850	...	89,053
Total United States	*5,821,525	5,640,000	5,788,165
Change from previous week, up 33,360			
Canada (to come)	.....	.....	.....

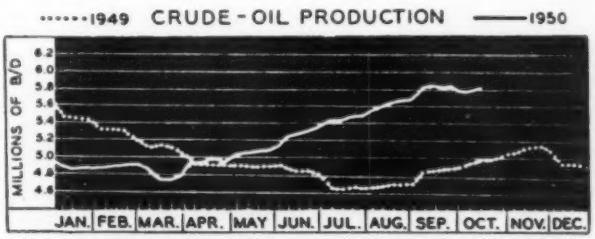
Total U. S. production January 1-October 21... †1,566,172,265 bbl.
Same period last year (crude plus cond.)..... 1,488,657,855 bbl.

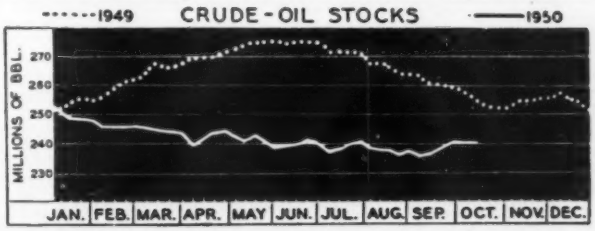
*Not incl. 98,655 bbl. condensate. †Incl. 28,618,660 bbl. condensate.

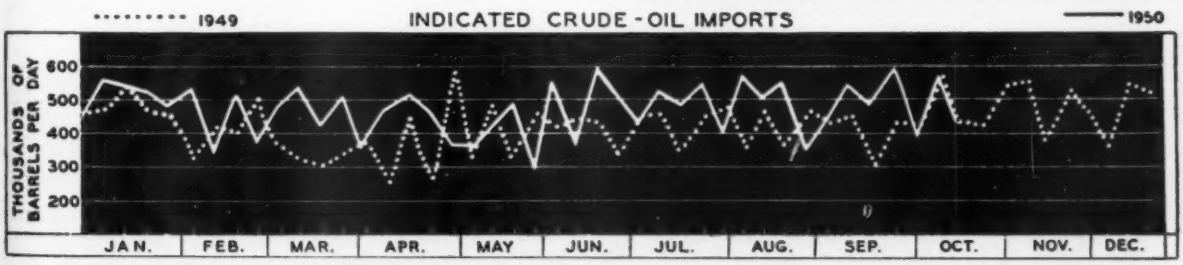
CRUDE-OIL STOCKS BY STATES OF ORIGIN*
(Thousands of barrels)

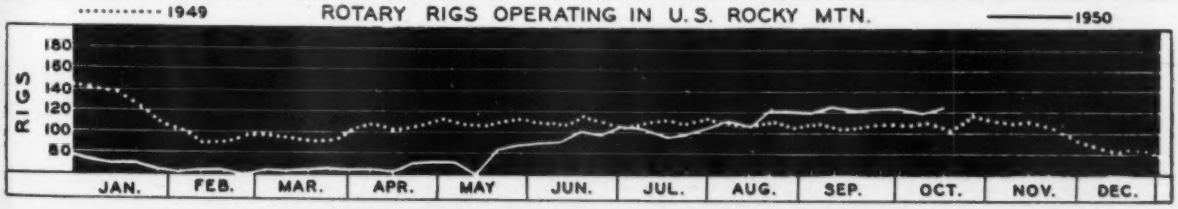
	Oct. 14, 1950	Oct. 7, 1950	Oct. 15, 1949
Pennsylvania Grade	2,335	2,370	3,249
Other Appalachian	1,344	1,348	1,900
Illinois, Indiana, Michigan	9,169	9,983	11,535
Arkansas	2,937	2,903	2,455
Louisiana	14,194	14,647	12,880
North	3,093	3,197	3,142
Gulf	11,101	11,450	9,738
Mississippi	2,399	2,380	2,216
New Mexico	6,925	6,315	7,029
Oklahoma and Kansas	36,565	36,239	37,027
Texas	117,740	117,348	117,178
East Texas	13,840	14,156	17,498
West Texas	46,692	46,267	45,188
Texas Gulf	28,357	28,349	28,348
Other Texas	28,851	28,576	26,144
Rocky Mountain	10,531	10,563	13,819
California	31,055	31,014	36,589
Foreign	5,923	6,101	7,178
Total	241,117	241,211	253,055

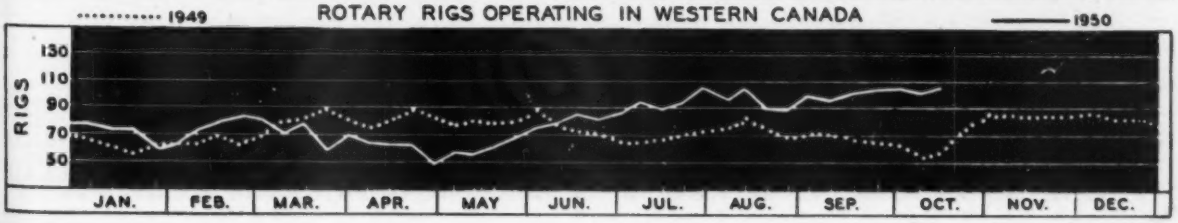
*Bureau of Mines.









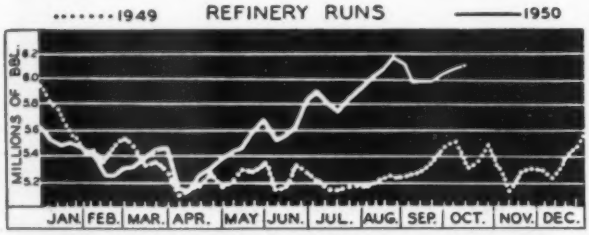


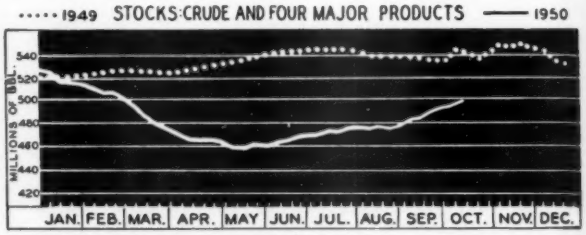
A.P.I. REFINERY REPORT, OCTOBER 14

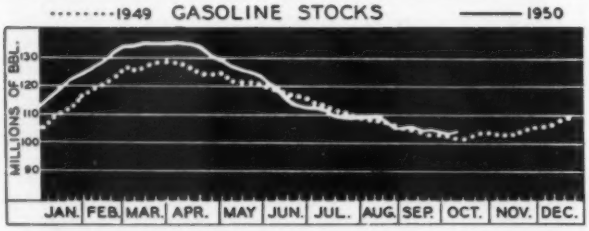
(Thousands of barrels)

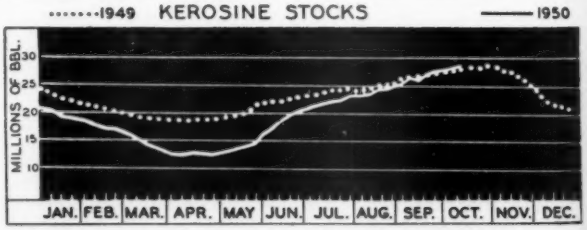
District—	Daily avg. crude runs	Daily average production				Stocks at refineries, bulk terminals, in transit and in pipe lines				Bureau of Mines, October 1949				
		Gasoline*	Kerosine	Distillate	Residual	Gasoline†	Kerosine	Distillate	Residual	Daily avg. crude runs	Daily average production: Gasoline*	Kerosine	Distillate	Residual
East Coast	960	380.6	46.6	253.6	204.6	24,631	10,631	25,427	11,517	775	324.3	30.7	180.2	190.2
Appalachian:														
District 1	113	51.3	6.9	13.7	10.3	2,635	491	865	408	92	42.3	5.9	11.5	10.1
District 2	74	30.3	3.7	7.3	13.0	1,181	216	284	150	61	32.4	3.1	6.2	10.9
Ind., Ill., Ky.	1,089	576.7	58.0	201.3	153.3	20,726	5,897	13,963	4,999	985	529.4	62.4	142.9	151.9
Okla., Kans., Mo.	506	274.9	12.9	114.6	53.1	10,181	1,423	8,356	1,330	441	246.7	19.5	82.9	62.1
Inland Texas	208	137.7	9.4	32.1	35.3	3,267	503	1,320	707	207	146.2	12.2	22.6	45.3
Texas Gulf Coast	1,521	654.8	112.8	316.8	277.7	15,967	4,849	12,202	5,752	1,289	618.4	87.2	272.0	258.8
La. Gulf Coast	479	243.3	54.6	116.6	60.4	6,513	2,821	3,870	2,456	462	220.5	54.2	110.2	50.1
N. La. and Ark.	73	27.0	7.4	19.3	6.7	2,211	457	595	211	75	30.8	7.2	10.3	16.2
Rocky Mountain:														
New Mexico	15	7.7	.4	2.4	3.9	84	25	40	30	12	6.9	.4	1.9	3.1
Other Rocky Mtn.	176	75.4	10.3	33.0	34.8	2,929	422	2,000	775	152	73.0	5.0	27.6	33.2
California	910	410.3	15.0	157.0	350.6	13,482	820	12,037	14,491	822	371.9	13.4	132.5	308.8
October 14, 1950	6,124	2,870.0	338.0	1,267.7	1,203.7	103,807	28,555	80,959	42,826	5,373	2,642.8	301.2	1,008.8	1,140.7
October 7, 1950	6,091	2,751.3	320.0	1,207.0	1,165.1	103,700	28,170	78,601	42,213	.....	.....	.....	.....	.....
October 15, 1949	5,324	2,568.3	266.4	964.6	1,094.1	102,767	27,758	86,952	69,081	.....	.....	.....	.....	.....

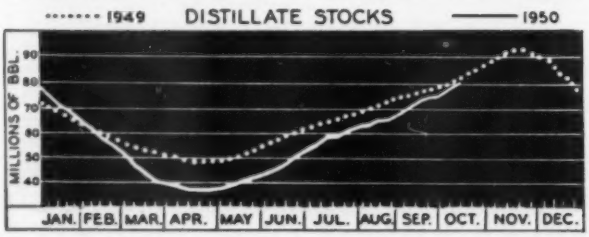
*At refineries including natural blended. †Finished and unfinished.

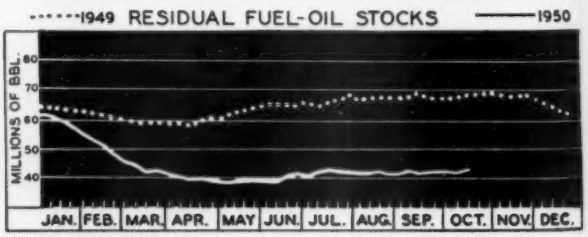


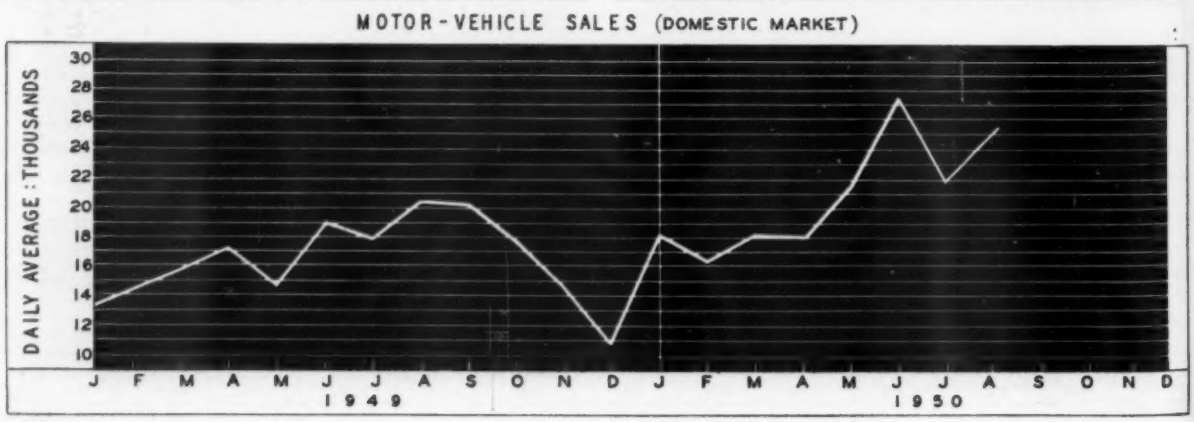












CRUDE PRICES

GRAVITY SCHEDULE

	Signal Hill, Calif.‡	Oklahoma, Kansas	Gulf Coast Tex.*	West Tex.†
18-18.9	$1.76	....	....	....
19-19.9	1.83	....	....	....
20-20.9	1.90	$2.25	....	$2.12
21-21.9	1.97	2.27	....	2.14
22-22.9	2.04	2.29	....	2.16
23-23.9	2.10	2.31	....	2.18
24-24.9	2.17	2.33	$2.56	2.20
25-25.9	2.24	2.35	2.58	2.22
26-26.9	2.31	2.37	2.60	2.24
27-27.9	2.37	2.39	2.62	2.26
28-28.9	2.42	2.41	2.64	2.28
29-29.9	2.48	2.43	2.66	2.30
30-30.9	2.54	2.45	2.68	2.32
31-31.9	2.59	2.47	2.70	2.34
32-32.9	2.64	2.49	2.72	2.36
33-33.9	....	2.51	2.74	2.38
34-34.9	....	2.53	2.76	2.40
35-35.9	....	2.55	2.78	2.42
36-36.9	....	2.57	2.80	2.44
37-37.9	....	2.59	2.82	2.46
38-38.9	....	2.61	2.84	2.48
39-39.9	....	2.63	2.86	2.50
40 and above	....	2.65	2.88	2.52

*For crude from Daboval, El Campo, and Sand Point.

†Includes Lea County, New Mexico. Last general price change represented a 50-cent increase becoming effective December 6, 1947.

‡Standard Oil Co. of California.

FLAT CRUDE PRICES

Representative posted schedules per barrel.	
East Texas†	$2.65
Kettleman Hills, California*	2.77
Beauregard Parish	2.60
Illinois Basin	2.77
Pecos County, Texas (Yates)	2.35
Bradford, Pennsylvania	4.10
Eastern Ill. and Western Ind.†	2.77
Tomball, Texas Gulf Coast	2.83

*37°-37.9°. †35° and above.

DEMAND for residual fuel oil on the West Coast is adding value to low-gravity crudes produced in California. Standard Oil Co. of California announced an increase in prices paid for heavy crudes effective October 17. The increase ranged from 10 cents a barrel for 14°-gravity crude to no change for crude lighter than 25.9°. The boost by Standard, which was met by General Petroleum Corp., tended to bring their low-gravity prices in line with Union Oil Co. postings made earlier this summer.

However, price disparity was established again by Union's announcement of another raise effective October 23. Union's new schedule represents an increase of 25 cents a barrel for 14°-gravity crude with smaller increases up to 25°. Even at the new Union price, low-gravity crude still averages about 35 cents a barrel less than in 1948.

On the East Coast, retail prices for kerosine and No. 2 fuel have been raised to cover the recent .5-cent boost at barge and tank-car levels. Heavy fuel on the New York Harbor market still has a 15-cent spread between high and low.

Dirty tanker rates for Gulf-East Coast movement continue at the maritime commission base plus 45 per cent, or about 63 cents a barrel for No. 6 fuel. Some residual was reported available on the Gulf Coast at $1.75 a barrel, but the addition of 63 cents would produce a New York Harbor delivered price that is above even the high quoted on that market.

The slowing up of shipping instructions for No. 2 fuel on the Group 3 market indicates that reseller tanks in North Central areas are about full. One supplier said that he had more instructions on No. 2 in August than he would have in October. The heavy-fuel market is very firm with little material offered.

REPRESENTATIVE QUOTATIONS

Representative spot-market quotation of leading suppliers as of October 23, 1950. Figures are f.o.b. plant for tank-car shipments in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor (barge)	Texas Gulf Coast
Regular gasoline, 80-82 octane	10⅜-10½	12-12.75	10¾-11
Premium gasoline, 86-88 octane	11¼-11½	13-13.75	11½-12
42-44 w.w. kerosine	8⅞-9⅛	10-10.1	8½-8¾
No. 2 straw fuel oil	8⅛-8⅜	9	7½-7¾
No. 6 residual	$1.65-1.75	$2.15-2.30	$1.80-1.85

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	6⅜	5⅞	6⅛
Grade 18-55	7.65	7.15	7.4

LUBRICATING OILS

South Texas

200 vis., No. 2-3 neutral	12.5-13
750 vis., No. 3-4 neutral	14.75
2,000 No. 5-6 neutral	16.5

LUBRICATING OILS

Mid-Continent

150-160 vis., D bright stock 0-10 pp.	27-28
200 vis., No. 3 neutral, 0-10 pp.	16.5-18.5

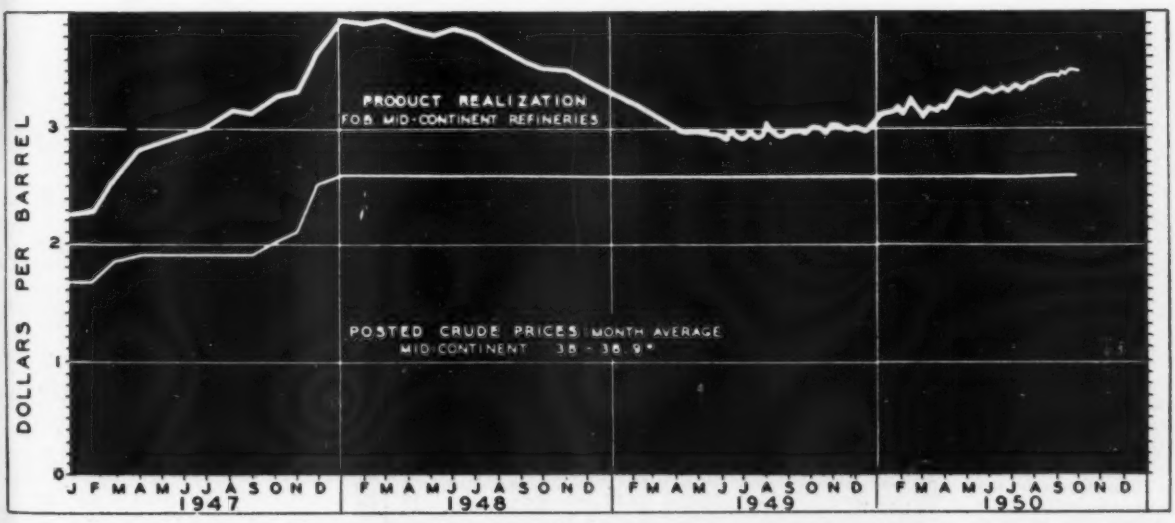
Western Pennsylvania

145-155 vis., 10 p.t. bright stock	29.5
180 vis., 0 p.t. neutral	30.5

WAX

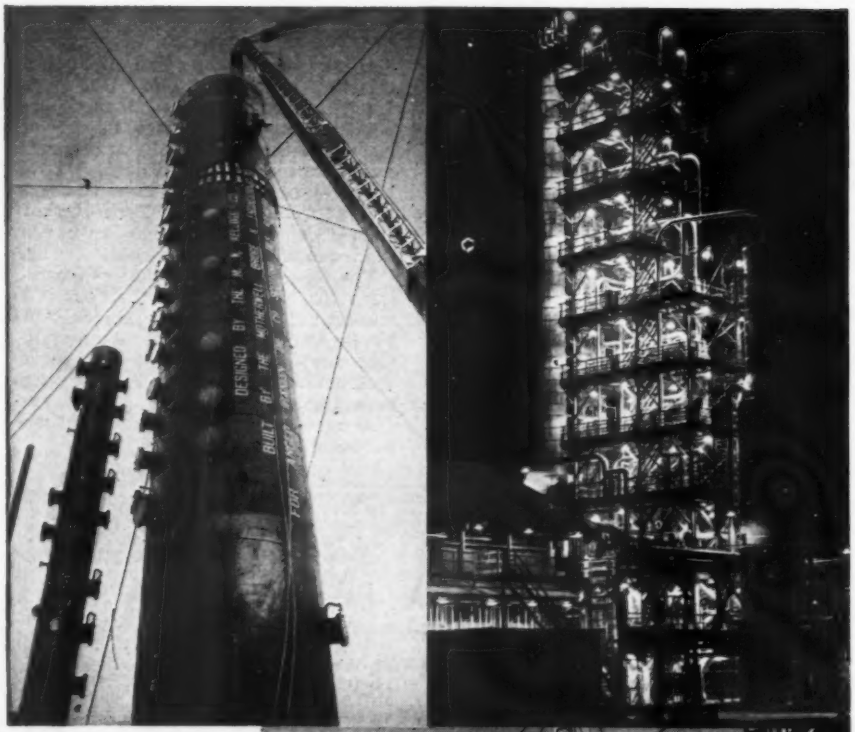
Mid-Continent

132-134 A.M.P.	5



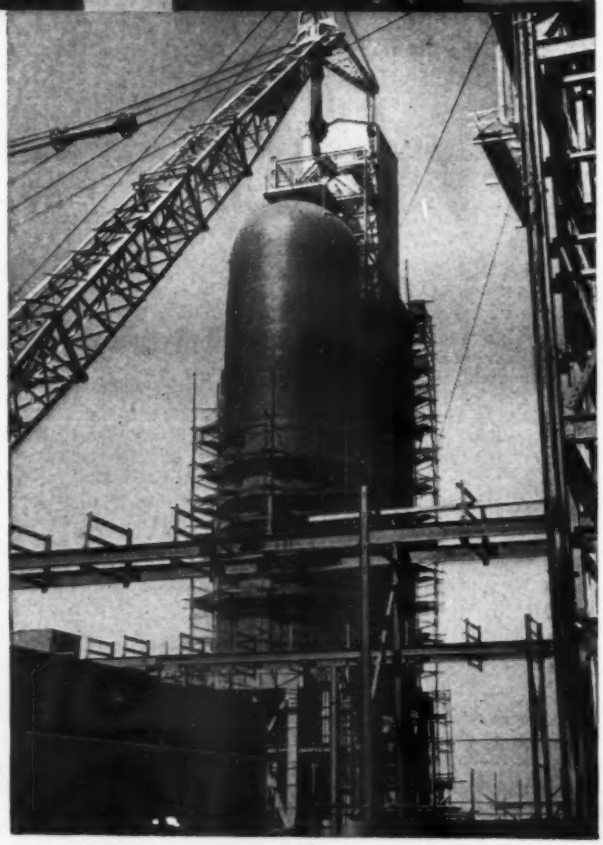
In this trend chart refinery realization is based on average Mid-Continent grade crude oil (not 38° gravity only) and average prices for refinery products as published in The Oil and Gas Journal basis Oklahoma (Group 3). Refinery yields confined to gasoline, kerosine, distillate, and fuel oil. Realization averaged $3.49 for week ended October 14, $3.50 for previous week, and $3.03 for October 1949.

Going up!



Throughput of Anglo-Iranian's refineries in Great Britain increased by 50% in 1949, and new plant will more than double their existing capacity. Here you see (top left) the positioning of the main fractionating column of the new distillation plant at Grangemouth refinery in Scotland.

The night scene (top right) is the new 2,000,000 tons per annum distillation unit at Llandarcy refinery in South Wales.



Abadan Refinery processed another record total in 1949—23,245,000 tons of Anglo-Iranian's crude oil production in Persia. New catalytic cracking plant, shown here under construction, will further increase the capacity and operational flexibility of this huge refinery, largest in the world.

101.2a

First and Biggest

oil producers in the Middle East since 1912, Anglo-Iranian Oil Company and its associated Companies also operate twelve refineries in Europe, Middle East and Australia; their sales organisation includes major marketing or supply interests in Europe, Asia, Africa and Australasia, with international ships' bunkering and aviation services.

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EQUIPMENT MEN . . . in the News

Larson and Cole Join Southern Geophysical

G. D. LARSON

R. C. COLE

G. D. Larson and Ralph C. Cole have joined Southern Geophysical Co. of Fort Worth in supervisory. positions, Dr. Sidon Harris, president, has announced.

Larson has been with Stanolind Oil & Gas Co. for the past 9 years and his seismograph experience has extended over the Gulf Coast, Mid-Continent, and Rocky Mountain areas. He has a M.S. degree in geology from University of Iowa.

Cole has been in geophysical work since 1934 when he was graduated with a B.S. degree in mechanical engineering from Missouri School of Mines in Rolla. During the past 16 years he has been with Western Geophysical Co., Stanolind, and Carr Geophysical Co. His seismograph surveys have taken him to Alabama, Mississippi, Louisiana, Arkansas, East Texas, and the Gulf Coast.

Hercules Tool Announces New Field Representatives

S. P. Tschappat, president of Hercules Tool Co., of Tulsa, has announced the following additions to the company's field staff: M. L. Creed, of Kilgore, Tex., will represent the firm in East Texas, North Louisiana, Mississippi, and Arkansas.

F. R. (Tod) White, of Midland, has been appointed field representative for West Texas, New Mexico, and Arizona. Harold R. Jarvis, of Mount Carmel, Ill., will serve Hercules in Illinois, Indiana, Kentucky, and Michigan.

Synchro-Start Products Starts Building New Plant

W. J. Williams, president Synchro-Start Products, Inc., has announced that ground was broken September 18 for the erection of the first unit of the new modern factory building to be located 15 miles northwest of the Chicago Loop in the village of Skokie. This unit will house the main offices and final assembly with the fabricating remaining in other plants as before until additional space can be built. The company manufactures automatic engine - control equipment. It is expected the main office will be able to move about February 1951.

Schlittler to Manage Sales For Grant Oil Tool Co.

MacClatchie Manufacturing Co. sales executive H. F. "Foy" Schlittler has been appointed sales manager of Grant Oil Tool Co., according to a recent announcement, and will in future supervise general sales for both concerns.

Jerry Engstrand, vice president of Grant Oil Tool, was at the same time appointed assistant to the president and placed in charge of special and foreign sales and public relations for the two organizations.

Kobe Opens Warehouse and Office at Healdton, Okla.

In an expansion of its field-service facilities in the active southern Oklahoma area, Kobe, Inc., has opened an office and warehouse at Healdton. The men responsible for the direction of Kobe's activities in this area are Charlie Edwards, district manager, and representatives Bill Wallace, Jim Oefinger, and Ken Rinker.

This new warehouse and office assures free pump operators a centrally located service for parts, replacements and repairs.

Responsible for Kobe's operations in southern Oklahoma are: District Manager Charlie Edwards and Representatives Bill Wallace, Jim Oefinger, and Ken Rinker.

Altens Opens Warehouse At Wichita Falls, Tex.

Altens Foundry & Machine Works has opened a new and complete warehouse at Wichita Falls, Tex. This Wichita Falls branch will enable supply stores throughout the Southwest to obtain immediate delivery on Altens equipment and eliminate transit delay on items produced in the company's Ohio plants.

Warren M. Benson, vice president of Altens who made the announcement, reports that the warehouse is already fully stocked with pumping units, pumping jacks, and surface, well-head, and pumping equipment, and is offering 24-hour service to supply stores in the area. Ted Michie has been named warehouse manager.

Alan Good Visits Cameron Officials in Houston

Alan Good, board chairman of Associated British Oil Engines, Ltd., was a visitor in Houston on October 6, to confer with Cameron Iron Works officials. British Oilfield Equipment Co., a subsidiary company of associated British Oil Engines, Ltd., has recently been licensed by Cameron Iron Works to manufacture and sell Cameron oilfield equipment in the sterling area.

McDougall Added to Cooper-Bessemer Odessa Sales Staff

Appointment of Clayton L. McDougall as sales and engineering representative to its Odessa office, was recently made by Cooper-Bessemer Corp. McDougall is a graduate engineer from University of Cincinnati and has been associated for over 6 years with Cooper-Bessemer at its headquarters plant in Mt. Vernon, Ohio.

His assignment to this Odessa field office, under the direction of Arthur W. Abel, Jr., branch manager, is being made with the purpose of further increasing Cooper - Bessemer's engineering service to the petroleum industries. His sales-engineering duties will concentrate on gas and diesel engines, engine-driven compressors, and liquid pumps for petroleum processing and transmission service.

(Continued on page 169)

XUM

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$12.00 a column inch one issue . . .
10% Discount three or more issues.

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USED ROTARY AND CABLE TOOL DRILLING TOOLS, WIRE LINES. E. A. KELLY, BOX 861, OKLAHOMA CITY. PHONE 5-6407.

2—100 HP. Superior Twin Gas Engine COMPRESSORS—located in Oklahoma. 1-K428 Buda Oilfield Engine. Alfred B. Kern, 223 Wright Bldg., Tulsa, Oklahoma.

WELL equipment. New and used spudders, rotaries, core drills, all sizes and types. Cable tools, drill pipe, bits, pipe. Fishing tools rented. Everything for well service. Pressey & Son, Pueblo, Colo.

Several Army Surplus 4½" x 6" Gaso Duplex 1860 Pumps—two piece skid mounted with Chrysler 8 cylinder engines. Will sell pumps only or complete units about half price.

H. H. COFFIELD
ATTN: W. H. Orr
Phones: 132—Rockdale, Texas
A-86064—Houston, Texas

FOR SALE

2 Rod & tubing Units, mounted on 6 X 6 G.M.C. Trucks
#1 Wilson Super Model with Whichtex single pole telescopic mast. Price $3500.00.
#2 Wilson Super Model, with Wilson double leg telescopic mast. Price $4000.00.

Both Units equipped with 2" and 2½" Tubing & Rod tools & lines. Ready to go. Quitting rod & tubing business.

FOX WELL SERVICING CO.
box 488, Healdton, Okla.

SURPLUS MACHINERY

2—New C. H. Wheeler, Solid Bronze, Horizontal Single Stage Centrifugal Pumps, 1500 GPM, 55' Head, 12" Suction, 8" Discharge, Connected Terry Turbines, 55 HP, 250# Pressure, 10# Back Pressure, 1500 RPM $2250.00 Ea.

1—New Aurora Pump, Type OMB, 8"x 10", 2000 GPM, 300' Head, 3000 RPM, Mounted on Steel Base For Turbine ..... $750.00 Ea.

1—Slightly Used Elliott Turbine, Type CY, 240 HP, 250# Pressure, 26" Vacuum, 10# Back Pressure $1250.00 Ea.

2—Slightly Used Dean Bros., 8"x7"x18"-12"x7"x18" Simplex Pumps, 90 GPM, 400 PSIG, For Butane or Propane ..... $750.00 Ea.

1—Slightly Used Union 14"x8"x12" Simplex Hot Oil Pump, 750# 650° F. 100 GPM, Serial #176763..... $500.00 Ea.

1—Used Wheatley Bros. 5"x10" Enclosed Gear Driven Power Pump, Model WBM, 2044, with 3½" CI Liners, 450#, 128 BPH, Direct Connected to Model BTH Buda Engine Mounted on Single Skid ..... $1750.00 Ea.

All Units FOB Tulsa, Oklahoma.

H. A. McCarthy
810 Thompson Bldg. Phone 5-3296
Tulsa 3, Okla.

EQUIPMENT FOR SALE

FOR SALE: 1942 Model Fort Worth Jumbo "C" Spudder in good repair and complete with tools. Skid type Advance Rumley pipe pulling unit capable of 4000' well servicing also in good condition. Large supply of cable tools also for sale. G. W. Hicks, Moline, Kansas.

EQUIPMENT FOR SALE

CASING: Good used lapweld, 5½"-13 lb. V threads $1.45; 7" OD 17 lb. $1.50; 6,000 ft. 7"-20 lb. $1.55; 5,000 ft. 5½"-17 lb. J-55 R2, seamless $2.65 ft.; 10,000 ft. 2" 4½ lb. lapweld tubing 36c ft. PHONE 7-5121. H. P. McGinnis, Tri-State Tool and Supply Co., Box 827, Parkersburg, West Va.

LINE PIPE FOR SALE

118,000' 4" O.D. x .165" Wall Seamless, 6.5#. Used as sweet gas line, taken up in 30' Lengths. Available for immediate inspection and delivery, FOB Mobeetie, Texas.

CASING & TUBING

30,000' 2⅜" O.D. 4# Good Used Lapweld Range 1 Tubing with New 10 Round Threads and Collars.

15,000' 2⅞" O.D. 6.4# New Seamless Range 1 and 2 Tubing. Available Plain Ends or 10 Round Thread T & C.

50,000' 5½" O.D. 10# Seamless Reconditioned Range 1 T & C Casing with New 11½ V-Threads and New 5½" Collars (Good for Shallow Wells).

6,000' 8⅝" O.D. 25# Good Reconditioned Casing, New 8 Round Threads and New 7¾" Collars.

100,000' 8⅝" O.D. 28# Excellent Grade Used Lapweld Plain End Pipe.

2,000' 9⅝" O.D. New Seamless Casing, Range 1 and 2.

7,000' 10¾" O.D. 32.75# Good Reconditioned Casing with New 8 Round Threads and New 8" Collars.

OTHER SIZES OF LINE PIPE, SEAMLESS TUBING IN SUITABLE SUBSTITUTE SIZES FOR STANDARD PIPE (EXCELLENT FOR GAS, GATHERING AND FLOW LINES), CASING AND TUBING AVAILABLE FOR IMMEDIATE DELIVERY.

FOR FURTHER INFORMATION, WIRE OR PHONE AT ONCE

A. J. STRUBEL
SIDney 1791 . . . 4946 Murdoch, St. Louis, Mo.

FOR SALE

1—24L Bucyrus Drilling Rig with standard mask. (Small tools to be inventoried.) This machine is about three years old, and has drilled about ten holes of a 1300 foot depth. Price $10,500.00. New-like condition. Sand lines are good.

1—1942 K7 International Water Truck, with large tank, water pump and hose, newly painted, four new tires. Good condition.

1—1942 Ford Jeep, new four wheel drive, new tires and transmission, 35,000 miles and in good condition.

1—1946 K7 International Trailer and twenty ton Jahn Low Boy Trailer; air brakes throughout. Truck has five speed transmission, two speed axle, three way transmission. Has brand new mud grip, twelve ply tires. Excellent condition. Price $3,250.00.

1—1945 Chevrolet two ton trailer and superior goose neck trailer, new motor, two speed axle, vacuum brakes, new transmission. Price $1,250.00.

1—1946 HD7 Allis-Chalmers Crawler Tractor, 300 hours since completely rebuilt. Tracks, track assembly, motor, transmission, clutch and brakes. Price $3,250.00. Blade $800.00 additional.

1—1950 TD 18A International Crawler Trailer with Bucyrus Erie Hyd. Angle Tilt Dozer and P-25 Double drum power. Unit has 600 hours. Also S-90 Cable Control Scraper, 10 yard capacity.

1—Heil eight yard Scraper, good tires.

12,000' 7" O.D. Well Casing 17 and 20 pounds. New $2.50 per foot. Used $1.90 per foot. 4500' 8" O.D. New Well Casing @ $3.30 per foot. 2" tubing and rods. 2200 feet 10" casing.

Phone: R. F. McMAHAN
Taylor 7253 or Taylor 4116, Louisville, Kentucky

EQUIPMENT FOR SALE

FOR CABLE TOOLS
DEGEN PIPE AND SUPPLY CO.
Box 107, Red Fork Station, Tulsa, Oklahoma

6,218 FEET 7" O.D. 17# new seamless casing H-40 Rg 2 @ 2.90 ft. Phone 5-8850, Tulsa.

CORE-DRILL Equipment for Sale: Franks Model "2,000" rig, mounted on KR-11 International Truck, complete with 38' derrick, Gardner-Denver 5x8 power mud pump, 2,000 watt Kohler light plant, and standard operating accessories. Contact Mr. J. D. Baker or Mr. W. H. Hawkes, P.O. Box 1654, Oklahoma City, Oklahoma. Telephone No. 2-6381.

4—175 H.P. Heine Water Tube Boilers. 24—6" Series 1500 Flanged End T & G Nickeladium Steel Ells. 38—24", 80—20", 40—18", 122—16", 50—10" Steel weld-neck and Slip on Flanges. Bourland Supply Co., Pampa, Texas.

FOR SALE: FAILING 1500 HEAVY DUTY $6,750.00 many accessories at a fraction of original cost. STEM, BITS, SUBS, CORE BBLS., LIGHT PLANTS, PUMPS, WATER TANK, etc., ALL SUBJECT TO PRIOR SALE. Write or call I. V. Cantrell, 208 N.W. 36th St., Okla. City, Okla. Phone 54-9764.

AMPHIBIOUS airplane: Eight place twin-engine Grumman Goose for sale or lease. Formerly owned by large oil company, excellent condition. Richard French, Genesee Airport, R.D. 2, Rochester, New York.

ROTARY Rig (WILSON) Draw Works, good for 2000', equipped practically new large FORD 6 Power Unit, Heavy Duty Clutch; GARDNER-DENVER heavy duty 5x10 Mud Pump (without motor) with steel skids, fly wheel, V-Belts, Belt Guard; OILWELL swivel not used since overhaul; 2100' of 3½" OD 30' drill pipe, HUGHES streamlined Acme Thread Tool Joints. Total Price FOR ALL—$8250.00. C. M. Barrington, Box 831, Coleman, Texas. Phone 4915.

6000'-4" O.D. Boiler Tubes; 10,000'-2¼" Boiler Tubes; 6000'-2" Boiler Tubes—all in 40' lengths and good condition. Box 237, Chetopa, Kansas.

7¼ x 12 USED Gardner-Denver Mud Hog Pump. See at Garrett Equipment Co., Wichita Falls, then contact D. F. MacKinnon, 3200 Main Street, Dallas, Texas, Phone RAndolph 6415.

FOR SALE: Two No. 2-A National Drilling Machines with steel masts. Located at the Davis Pipe and Supply yard at Chanute, Kansas.

NEW 24" O.D. PIPE

7,000 ft.—24" O.D. Pipe, ¼" wall, Republic Electric Fusion Weld, 30' lengths, Plain Ends beveled. Location: Harvey, La.

MID-STATES PIPE & SUPPLY CO.
Ph. 2-9128 Tulsa, Okla.

STANDARD BLACK PIPE

Good Used Condition

2"	Standard—Approximately	25,000 feet
3"	Standard—Approximately	15,000 feet
4"	Standard—Approximately	20,000 feet
6"	Standard—Approximately	7,500 feet
8"	Standard—Approximately	10,000 feet
10"	Standard—Approximately	2,500 feet
12"	Standard—Approximately	2,500 feet

Single Random Lengths
Immediate Delivery
Subject to Prior Sale

Write—Wire—Phone

SONKEN-GALAMBA CORPORATION
2nd and Riverview (C-641)
Kansas City 18, Kansas
THatcher 8243

EQUIPMENT FOR SALE

AVAILABLE for sale and immediate shipment #1 T & C 2" line pipe, seamless and lapweld casing, tanks. Call or write Edco Pipe & Supply Company, Box 565, Drumright, Oklahoma.

WAR SURPLUS MACHINERY

Gaso, Byron Jackson, Aurora, Wayne, Lombard & Hale Fire Pumps with Engines, 1½ to 25 KW Generator Sets or Light Plants, Engines, Suction Hose, Fire Hose, Victaulic Couplings & Etc. Write for listing. H. A. McCarthy, 310 Thompson Bldg., Phone 5-3296, Tulsa, Oklahoma.

FOR SALE: Bucyrus Erie Spudder, 36 L, late 47, on wheels, casing truck, reinforced mast, Buda Diesel or Buda gasoline and natural gas motor, knock down house, timbers, walk, guy line and stakes. Excellent condition. Ten Thousand. Tools 50% list. Ed Obermiller, 140 Sixth St., North Canton, Ohio.

FOR SALE

9—230 H.P. Bessemer Type 10 Engines with compressors, Steel Buildings, Valves and Fittings complete for installation. Located Salem, Illinois Oilfield.

ENGLE PETROLEUM, INCORPORATED
Box 655, Evansville, Indiana
Telephone 5-5179

EQUIPMENT FOR SALE

TANKS FOR SALE: 3—80,000 bbl. all steel welded, 2—80,000 bbl. all steel riveted, 4—55,000 bbl. all steel welded, 1—55,000 bbl. all steel riveted. Will cut down or sell as is, where is. Phone 3-6141, W. C. Berry, Tulsa, Oklahoma.

FOR SALE: Diesel powered, skid mounted, single stand derrick, 3,000' drill rig drill pipe, drill collars, Halliburton Line, plenty tools, 500' new 5½ J-55 15x17 lbs. casing, three trucks and trailers, also 70 barrel water tank. Cash only $66,000.00. Box D-734, The Oil and Gas Journal, Tulsa, Oklahoma.

BOILERS FOR SALE: 18 Code Oil Field Boilers, 50 to 87 H.P., 100 to 200 Lbs. W.P., Operated Under Hartford into 1948, Not Fired Since. Located on Leases Vicinity Pampa, Texas. Offered Subject to Prior Sale. $500.00 to $700 each, as is, where is. Contact Max Harbison, Kewanee Oil Company, Pampa, Texas.

BARGAIN FOR QUICK SALE

Large Steam Rig Complete Ready to go. 14x14 Engine, 18" & 20" Pumps, 10,000' 4½ Drill Pipe, 136' Derrick All 300 Ton Equipment. Everything Good Condition. **McDaniel & Beecherl Drlg. Co.,** Phone: Randolph 6910 Dallas, Texas, or Phone 3651, Odessa, Texas.

FOR SALE

Open bids are being accepted on the following equipment:

1—"2000" Franks Core Drill Unit mounted on 5 Ton 1944 Model International truck with Timken Tandem Drive complete with 5 x 8 Gardner-Denver Mud Pump; traveling blocks, hydraulic pumps; tubing elevator; casing elevators; drill collars; overshots, 2109 feet drill pipe and 1—1½ KW Kohler light plant.

2—International 1948 Model KB7 stake body trucks each with 780 gallon skid-type water tanks.

1—5 ton Fruehauf Pole trailer.

1—300 gallon gasoline trailer.

Miscellaneous items including small tools, small pumps, fire extinguishers, pipe rack, pipe straightener; chain hoist, etc.

Above equipment is in excellent condition and may be inspected at our Hastings Field Storehouse midway between Pearland and Alvin, Texas. Call, wire or write:

STANOLIND OIL & GAS COMPANY

Attn.: Mr. O. T. Craig, P. O. Box 3092, Gulf Building, Houston 1, Texas

---

LIQUIDATION SPECIAL!

COMPLETE WATER TREATING UNIT

Hot Lime System

3200 G.P.H. Make-Up 18000 G.P.H. Condensate

Manufactured by Permutit.

Consists of:

Chemical feed tank 5' x 3'8" w/motor driven agitator.
Chemical pump.
Hot lime soda filter 5'6" x 7'4", 4300 G.P.H. capacity.
Wash pump for above.
Hot lime soda deaerator and softener 9' x 26' on 9' stand.
All controls, valves, fittings, etc., necessary for operation.

FIRST CLASS CONDITION IN EVERY RESPECT

WRITE — WIRE — PHONE

FOR COMPLETE

INFORMATION AND

OTHER LISTINGS

DULIEN STEEL PRODUCTS, INC.
of Washington
P. O. BOX 667
COTTON VALLEY, LA.
PHONE: COTTON VALLEY 26

XUM

EQUIPMENT FOR SALE

FOR SALE: 300 Amp Westinghouse welding machine powered by 6-BK Waukesha engine. Completely overhauled. Less than 50% of new price. Melton Supply Company, Box 1360, Seminole, Oklahoma.

FOR SALE: 7000' 4½" o.d. 14 lb., range 2, seamless. All new threads and couplings. Price $1.50 f.o.b. Coffeyville, Kans. M. J. Regan, phones 448 and 3892.

FOR SALE at Odessa, Texas: 1 used 125 HP, 300# Working Pressure Donovan ASME Code Boiler equipped with Elesco Superheater and Fittings, purchased new 1936, $2500. Cities Service Oil Co., Patridge, Bartlesville, Oklahoma.

FOR SALE: One Type-L Star Spudder with shear poles, P.A. 100 gas-gasoline motor, new belt. E. A. Kelly, Box 861, Oklahoma City, Okla. Phone 5-6407.

CASING, Good 4½", 13.50#, 5000' @ $1.25. 5000' 4" pipe T&C. 5 x 10 G-D pump, new liners, pistons, rods. Fred E. Butler, Box 1832, Casper, Wyo.

FOR SALE: 200 Reed shrunk, 4½" drill pipe joints. Suitable for further use. M. J. Regan, Coffeyville, Kans.

PIPE FOR SALE: We are finishing taking up 10,000 feet of 6" O.D., 10.22 lb. splendid transmission line, straight, beveled, 40' lengths and ready to lay. Also, 10,000 feet of heavy, good threads, long collars 2" tubing. The Allen Gas Corp., Paola, Kansas.

EQUIPMENT WANTED

ONE used Gardner-Denver pump, F X F, No. 172, (4x5) must be in A-1 condition. Will pay 50% of list price. Chas. W. Scott, 6129 Berkshire Lane, Dallas 5, Texas, Phone EMerson 6500.

WANTED: USED 4½" DRILL PIPE Box D-606, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Used **FAILING 1500, MAYHEW 2000** rig complete and in good shape, late model, not over four years old. Box D-720, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Used, **LATE MODEL** mud pump, EMSCO 7½ x 12 or 7½ x 14 size. Box D-717, The Oil and Gas Journal, Tulsa, Oklahoma.

HELP WANTED

WANTED: Engineer familiar with Gas-fired Unit Heater design. Box D-701, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOPHYSICIST — Thoroughly qualified for intensive review and re-interpretation of Gulf Coast and West Texas seismic data. Established Houston Office with old, successful company now expanding. Submit detailed statement qualifications, experience. Reply Box D-704, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED by active Independent—Water Flood Engineer. Must be technically qualified to plan and conduct a flood and supervise same in field. An excellent opportunity for right person. Box D-743, The Oil and Gas Journal, Tulsa, Oklahoma.

SALES ENGINEERS
OPERATIONS SUPERVISORS
PERFORATOR OPERATORS

Only Experienced Men Need Apply

WRITE ONLY

WELEX JET SERVICES, INC.
3900 Hemphill Street, Fort Worth 9, Tex.

Corrosion Engineer

New large oil pipe line company requires two corrosion engineers immediately to set up and maintain corrosion protection on 1000 mile oil pipe line. Two years' experience minimum required. Should be familiar with all phases of field and office work. Include full details of professional experience in first letter. Box D-741, The Oil and Gas Journal, Tulsa, Oklahoma.

HELP WANTED

PROGRESSIVE well financed closely held company desires individual experienced in development and direction of exploratory drilling as well as production in Kansas and Rocky Mountain Regions. Will form company for right man to participate. Lease areas now are under consideration. Box D-725, The Oil and Gas Journal, Tulsa, Oklahoma.

FOREIGN and Domestic Oil Employment Directory covering the oil industry, showing where to apply for jobs. Price $5.00. Oil Industry Mailing List, Box 2603, Tulsa, Okla.

PETROLEUM ENGINEER (JUNIOR) with at least one year production or drilling experience to work for major oil company in Venezuela. Single status. Give full details in reply to P. O. Box 2819, Dallas, Texas.

EXPERIENCED Seismologists and Seismic Computers by large, well established geophysical company. Give full details of education and experience in letter. Reply Box D-707, The Oil and Gas Journal, Tulsa, Oklahoma.

EXPERIENCED Seismic Party Chief. Excellent opportunity. Good, sound connection. Furnish full particulars regarding experience. Reply Box D-705, The Oil and Gas Journal, Tulsa, Oklahoma.

MIDWEST natural gas transmission and distribution company has opening for operating executive. Furnish full information as to qualifications. Box D-729, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM Engineer or Geologist with experience in evaluation and subsurface studies in Gulf Coast wanted by sound independent. Age 30-45. In application state salary expected and enclose college transcript. Box D-631, The Oil and Gas Journal, Tulsa, Oklahoma.

LAND MAN, with experience, for oil company, in Shreveport, Louisiana, area, who can handle executive responsibilities. Replies confidential. Box D-740, The Oil and Gas Journal, Tulsa, Oklahoma.

RIG MECHANIC with 2-3 years experience in major overhaul of drilling rig engines for work with major oil company in Venezuela. Single status. Give full details in reply to P. O. Box 2819, Dallas, Texas.

FOR IMMEDIATE employment. Trained experienced Observers, Surveyors and computers. For seismic exploration crews. Age limit 42 years. Domestic and foreign work. Submit experience record in first letter. All replies confidential. Box D-730, The Oil and Gas Journal, Tulsa, Okla.

WANTED: Graduate Petroleum or Mechanical Engineers, or men with several years of experience in drilling or petroleum production work for employment with Oil Well Service Company. Reply to Box D-733, in care of The Oil and Gas Journal, Tulsa, Oklahoma, giving education, work experience, age, military service record, marital status and a recent photograph.

DRAFTSMEN

Positions open for draftsmen experienced in general refinery drafting, pressure vessel design, piping layout, etc. Give education, experience, and salary expected.

KOCH ENGINEERING CO., INC.
335 West Lewis Street
Wichita, Kansas

ESTIMATOR

Experienced ENGINEER familiar with Oil Refinery design and capable of estimating process equipment from flow diagrams.

Give full information, experience record and salary expected.

ARTHUR G. McKEE & CO.
2300 CHESTER AVE.
CLEVELAND 1, OHIO

HELP WANTED

GEOPHYSICIST with geological training. Extensive experience in seismic interpretation. Review work. Stable location. Reply Box D-706, The Oil and Gas Journal, Tulsa, Oklahoma.

ENGINEERS, Executives, Technical Men. Salaried positions — $3600 to $30,000. This confidential service for outstanding men who desire a change of connection will develop and conduct preliminary negotiations without risk to present position. Send name and address for details. Tomsett Associates, 1204 Berger Bldg., Pittsburgh 19, Pa.

SITUATIONS WANTED

ATTENTION: Well established oil well drilling contractor desires to manage and supervise: Individuals', groups', small or medium-sized oil companies' drilling, production and operating problems in Central and Western Texas, and New Mexico. Personal interview by appointment is desired. Makin Drilling Company, Box No 131, Ph. No. 131, Hobbs, New Mexico.

DRILLING Contractor operating in West Texas and New Mexico desires to contact small or medium-sized independent oil company who needs an operating manager. Personal interview desired. Twenty years experience in all phases of the oil industry. Address replies to Box D-644, The Oil and Gas Journal, Tulsa, Oklahoma.

SALES ENGINEER: Experienced Houston area will represent your process plant equipment. Box D-723, The Oil and Gas Journal, Tulsa, Oklahoma.

EXPERIENCED SALES ENGINEER now available to represent manufacturer of any type oilfield equipment. Well known among domestic and export purchasers. Valuable experience on heavy equipment last five years. Box D-726, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST: 34 yrs., married, with 11 yrs. of extensive major and independent company experience in all phases of petroleum exploration and development in Texas, Louisiana, and New Mexico. Prefer connection with active independent. Excellent references. Box D-715, The Oil and Gas Journal, Tulsa, Oklahoma.

PRODUCTION Superintendent, 35 years experience in 3 southwest states, desires supervision small property East Texas area. Excellent qualifications building up old production. Available January 1, 1951. Box D-690, The Oil and Gas Journal, Tulsa, Oklahoma.

REGISTERED MECHANICAL ENGINEER desires to invest in and assume engineering position with pressure vessel and/or tank fabricator for Tulsa area. Box D-739, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST with varied experience in several states including several districts in Texas. Now in Permian Basin. Mature, of good health, and free of military commitments. Box D-738, The Oil and Gas Journal, Tulsa, Oklahoma.

ASSISTANT Division Landman with Major Oil Company desires change, would consider District Land job with large independent or Major Company. Box D-742, The Oil and Gas Journal, Tulsa, Oklahoma.

SERVICES

IF the banks won't go, we will loan on diamonds and jewelry. Insured. Bonded. Dependable. Johnny Clingingsmith, 308 Clingingsmith Building, 1707½ Main, Dallas, Texas.

FOR SALE

FOR SALE: Patent on oil well valve which cuts off well-flow or gas-flow while cable remains in hole; also will cut off well fire immediately, any distance from valve. Benjamin F. Hill, Inventor, 4242 West Eighth, Tulsa.

TITANIA GEMSTONES

Can supply the new sensationally beautiful synthetic titania gemstone "rainbow diamond," facet cut, showing greater brilliance than the diamond and at a small fraction the cost. Harder than amethyst. Christmas is coming.

C. C. BOAK—Tonopah, Nev.

ROYALTIES

DEEDED ROYALTIES
San Juan Basin & Permian Basin. Write Harry S. Wright, Wright Bldg., Farmington, New Mexico

MONTANA ROYALTIES
Millions of acres now leased by world's major companies, with huge drilling play in prospect. For booklet describing Montana geology and oil development, write Landowners Royalty Company, Box 1225, Great Falls, Montana.

LEASE AND DRILLING BLOCKS

SCURRY COUNTY: Snyder lot 50 x 140 in N.W.¼ of section 155. Want drilling, override and bonus. V. A. Epps, Pioneer Hotel, Tucson, Arizona.

NEED capital to develop Creek County, Oklahoma, lease offset by Red Fork sand production. P.O. Box 958, Telephone 875, Bristow, Oklahoma.

OREGON LEASES: Have for lease 36,000 acres and can get additional 50,000 acres that is adjacent. Vicinity of Mitchell well. If interested write H. H. Schmitt, Prineville, Oregon.

U. S. LANDS can be filed for Government oil lease. Good geology. Opportunity in developing area. Need some associates. S. W. Pressey, Pueblo, Colo.

OIL AND GAS LEASES, Shelby County, Texas. Holdings in and around active major company blocks. Write for full details. Box D-722, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE—⅛ working interest recently developed Berea production, Ashland County, Ohio. 13 pumping wells, 40 bbl. per day. 345 acres, many good locations, three wells under contract. For information, write or wire F. G. Browne, Marion Building, Marion, Ohio.

WILL ASSIGN ½ interest in oil rights on acreage now producing gas from top Mississippi Lime and Arbuckle Lime for completing a 1800' well with cable tools. Proven Geology. Box 237, Chetopa, Kansas.

LEASES ROYALTIES

Producing and Nonproducing
Bought and Sold—Any Area
Inquiries Invited

B. D. BUCKLEY
6635 Delmar Ave., St. Louis 5, Mo.

ALBERTA
Leases and Royalties
ALBERTA LEASEHOLDS
131-Ninth Avenue West
Calgary, Alberta, Canada

A SURFACE GEOLOGIST

WHO DISCOVERED...

...the richest Oil Pool ever opened in Kansas and located the famous Stone Bluff Oil Field in Oklahoma enabled investors to realize $588 return on every dollar invested. On one Kansas development one party got $1,125 for every dollar invested. This Surface Geologist has discovered another promising looking Anticline and is now offering to give you and other owners the best 120-acre lease on this Anticline and his personal services in drilling the well for nothing.

Did you ever hear of such an offer? For prompt payment of $1,000 for each 1/16 subject to prior sale he will drill well to deep sand and equip same, unless a rich strike is made in shallower depths. Papers report a 3,000 barrel well north of us in deep sand. For further information—ACT QUICK.

Address SURFACE GEOLOGIST
P.O. Box 142, Tulsa, Oklahoma

FOR SALE OR CHARTER

FOR SALE OR CHARTER: 83' TWIN SCREW DIESEL BOAT, IDEAL FOR SURVEY OR CREW. B. O. SCOTT, 5033 FOURTH STREET, PORT ARTHUR, TEXAS.

ADDRESS WANTED

WANTED: To know the address of Mr. John Wood. He is an oil field employe working as a driller or cementer. He has worked in South Texas and Snyder area. Mr. Wood is married and has four children. He is blond with light complexion, and his weight is approximately two hundred pounds. We will pay the first person giving us his correct address and employer $10.00. Contact Black & Baird, P. O. Box 207, telephone No. 1429, in Alice, Texas.

LEGAL BLANKS

BURKHART LEGAL BLANKS since 190[illegible] Oil-Gas (all states), Business, Real Estate Legal Forms, Leases, Revised With Government Regulations, Commercial Printing Catalog and Samples on request. Burkhart Printing & Stationery Company, 115 South Cincinnati, Tulsa, 3, Oklahoma.

PATENT ATTORNEYS

PATENT Practice before U. S. Patent Office. Validity and Infringement Investigations and Opinions. Booklet and form "Evidence of Conception" forwarded upon request. Lancaster, Allwine & Rommel Registered Patent Attorney, Suite 418 815-15th Street, N.W., Washington 5, D. C.

WANTED

MANUFACTURERS' AGENT

Manufacturers' agent covering Gulf Coast oil fields, refineries and process plants, seeks additional line. Maintains office, warehouse and shop in Houston and eight sales engineers in the field.

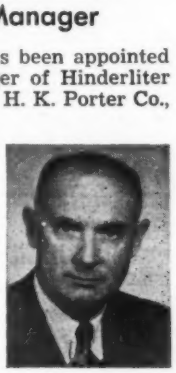
Box D-713, The Oil and Gas Journal, Tulsa, Oklahoma

EQUIPMENT MEN

(Continued from page 165)

Hinderliter Appoints New General Sales Manager

P. J. Gallagher has been appointed general sales manager of Hinderliter Tool Co., Division of H. K. Porter Co., Inc., it has been announced by T. M. Evans, president.



P. J. GALLAGHER

Gallagher will direct sales of the company's complete line of products, which includes oil-well drilling equipment, valves, and air-brake parts. He will headquarter at the firm's main office and factory in Tulsa. He was formerly district sales manager for Porter in Detroit and previous to his new post was sales manager for valves at Tulsa.

Stewart & Stevenson Men Attend Motor Meeting

Five members of the Stewart & Stevenson Services, Inc., sales organization will attend a meeting the week of October 22 at the Chrysler Corp. plant in Detroit. Following the Chrysler meeting, they will make a tour of the General Motors Detroit diesel-engine factory at Detroit.

The men are Ray Loden, Houston; Emmett Dobbs, Houston; N. N. Elkins, Corpus Christi; J. C. Brown, McAllen, Tex.; Carsey Manning, Longview, Tex.; and A. B. Grant, Beaumont, Tex.

Blankenship Honored by Universal at Dinner

Harvey W. Blankenship, director of public relations of Universal Oil Products Co., was honored September 29 at a dinner in the Crystal Ballroom of the Blackstone Hotel, Chicago.

BLANKENSHIP

The affair was given by David W. Harris, president of Universal, in recognition of Blankenship's 5 years of service to the company. Guests attending included Chicago advertising men, newspaper writers, industrial publishers, bankers, and lawyers. Also attending were advertising and public-relations men from New York, Cleveland, Tulsa, Oklahoma City, and Houston.

The principal speaker of the evening was Col. Russell L. Putman, Chicago publisher. In addition to Colonel Putman's address, brief talks were made by Harris, and Dr. Gustav Egloff, Universal's internationally known petroleum scientist.

W. H. Stueve Joins Carnahan & Thompson

W. H. Stueve became associated with Carnahan & Thompson, mechanical and electrical-consulting engineers in Oklahoma City this month after many years as sales engineer with Oklahoma Gas & Electric Co. In the petroleum industry, Stueve is best known for his sales-engineering work in helping to electrify pumping wells, pipe lines, and refineries.

Because of his knowledge of oil men's problems, Stueve was employed by Texas Pipeline Co. during World War II to act as chief electrical engineer for War Emergency Pipelines, Inc. This operation was widely known as the Big Inch and Little Big Inch pipe lines. Under Stueve's direction the Big Inch stations were converted to the use of centrifugal compressors for pumping natural gas, the first time this method was used in the United States.

One of Stueve's first jobs as associate of Carnahan & Thompson will be the designing of electrical facilities for the Santos-San Paulo pipe line in Brazil.

ADVERTISERS

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Allis-Chalmers Mfg. Co. 12
Allen's Foundry & Machine Works 156
American Car and Foundry Company 25
American Hoist and Derrick Company 143
Anchor Petroleum Company 50
Anglo-Iranian Oil Co., Limited 164
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Indiana Fields

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Warrick County: National Associated Petroleum Co. 1 Yeck, SW NE NW 28-4s-9w, IP 14 bbl., McClosky 1,890-1,900 ft., TD 2,082 ft.

INDIANA WILDCAT FAILURES

Daviess County: National Associated Petroleum Co. 1 Johnson, SE SW NE 10-2n-7w, dry, TD 1,005 ft.

Sunlight Coal Co. 1 Schrock, NW SE SE 1-3n-6w, dry, TD 735 ft.

Dubois County: National Associated Petroleum Co. 1 Mann, NE NE NE 36-1n-6w, dry, TD 850 ft.

Gibson County: Ashland Oil & Refining Co. et al., 1 Wilson, NW SW SW 20-1s-10w, dry, TD 2,053 ft.

Skiles Oil Corp. 1 Woods, SE SW SE 13-2s-12w, dry, TD 2,800 ft.

Cherry-Kidd 1 Ireland, SW NW NW 30-3s-9w, dry, TD 2,035 ft.

Knox County: Illinois Mid-Continent Co. 1 Orr, NE NW SW 1-1s-12w, dry, TD 2,408 ft.

Vanderburgh County: C. Wood and Maynard Rogers 1 Laubscher et al., NW NW NE 35-5s-11w, dry, TD 1,812 ft.

Warrick County: National Associated Petroleum Co. 1 Hart Corp., NW NE SW 9-6s-8w, dry, TD 1,800 ft.

WESTERN KENTUCKY WILDCAT FAILURES

Hancock County: J. C. Miller 1 Estes, SW NW SW NE 10-Q-32, dry, TD 1,450 ft.

Henderson County: Roche-Chandler-Moran 1 Roberts, W½ SW SE SE 19-P-24, dry, TD 2,458 ft.

Ryan Oil Co. 1 McMurtry, S½ NE NE SE 8-O-22, dry, TD 2,696 ft.

McLean County: R. E. Hupp et al., 1 Baird, SWc SW SW NW 5-M-29, dry, TD 2,178 ft.

EASTERN KENTUCKY

ASHLAND.—In the Isonville pool of eastern Elliott County, Kentucky-Ohio Gas Co. has completed its second well on William Oliver lease. Situated on Right Fork of Newcombe Creek, test logged producing Weir sand from 1,085 to 1,107 ft. with a total depth of 1,111 ft. After shot, well responded with 5 bbl. of oil daily. In same pool C. C. Haynes has completed 4 Oliver for 10 bbl. daily from Weir sand at total depth 1,180 ft.

CALENDAR

National Lubricating Grease Institute, annual meeting, Edgewater Beach Hotel, Chicago, October 30-November 1.

November

Mid-Continent Oil and Gas Association, Louisiana-Arkansas Division, annual meeting, Roosevelt Hotel, New Orleans, November 2-3.

New Mexico Geological Society, first annual conference, San Juan Basin; headquarters, Albuquerque; November 3-5.

Society of Automotive Engineers, Fuels and Lubricants meeting, Mayo Hotel, Tulsa, November 9-10.

California Natural Gasoline Association, Silver Anniversary, Los Angeles, November 9-10.

American Petroleum Institute, annual meeting, Biltmore and Ambassador Hotels, Los Angeles, November 13-16.

American Society of Mechanical Engineers, annual meeting, Grand Central Palace, New York, November 27-December 1

Southwestern Geophysical and Geological Conference, Hotel Texas, Fort Worth, November 30-December 2.

December

American Institute of Mining and Metallurgical Engineers, annual joint meeting, Texas sections, Texas Technological College, Lubbock, Tex., December 1-2.

American Institute of Chemical Engineers, annual meeting, Columbus, Ohio, December 3-6.

Interstate Oil Compact Commission, winter meeting, Shamrock Hotel, Houston, December 11-13.

NOMADS

Tulsa Nomads, third Friday of each month. After Five Room, Tulsa Hotel.

Dallas-Fort Worth Nomads, first Monday of each month, Greater Dallas Club.

Houston Nomads, second Monday of each month. Ye Olde College Inn, Houston.

Los Angeles Nomads, second Wednesday of each month. Jonathan Club.

New York Nomads, dinner meeting November 6, Louis Sherry's; annual Christmas dance, December 9, Hotel Pierre.

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"I wasn't asleep," said the Dormouse

EVERY boy and girl knows the drowsy Dormouse of Alice in Wonderland. He was elbowed and pinched by the Mad Hatter and the March Hare as he mumbled in his sleep at the tea party.

But our young people aren't so well versed in everyday economics. They have a sadly distorted picture of the profits of business. They don't realize why profits are necessary, how small they are, or how they are divided.

For instance, in a recent survey of high school seniors, it was discovered that they believe over 50% of the sales dollar is profit and they think stockholders receive 24% of it. Actually business profit averages less than 8%, with less than 3% distributed as dividends. Business uses most of its profit, moderate as it is, for new plant and equipment, to improve products and to make more jobs.

Misconceptions among our youth bode ill for America's future. They open the door for too ready acceptance of dangerous isms and false foreign philosophies. Such misunderstanding of economics can be corrected only with facts supplied by business itself. You as a leader in your community must share this responsibility.

The American business man must not allow himself to be cast in the role of the Dormouse, pinched and pilloried by the March Hares of communism and the Mad Hatters of the "everything for nothing" state.

THE YOUNGSTOWN SHEET & TUBE CO. 1900 YOUNGSTOWN 1950 50 YEARS OF SERVICE

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General Offices -- Youngstown 1, Ohio
Export Offices--500 Fifth Avenue, New York

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XUM

Moving your rig into new territory?

ONE OF THE FIRST persons you'll want to talk to is the Hughes man. He knows the type of rock bits which have made the best footage in the various formations you'll be running in. The Hughes service organization is the only one which covers *consistently* all of the active oil fields in the U. S. and Canada wherever rotary drilling is done.

There were more than 2,000 rigs running in this area last year and practically every one was contacted at least twice a week by a Hughes field man! Hughes field representatives drove over 8,000,000 miles last year to make this record possible!

The Hughes men visit more rigs more times. That is the reason Hughes knowledge of special drilling conditions and rock-bit development in the field leads all competitors. This knowledge is available to you, of course, at any time. We invite you to make use of it.

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TOOL COMPANY

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